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FORM PTO-1390 (Modified) (REV 10-95) U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE ATTORNEY'S DOCKET NUMBER L-1301-1

TRANSMITTAL LETTER TO THE UNITED ST DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. 371

U.S. APPLICATION NO. (IF KNOWN, SEE 37 CFR): 09/830814

INTERNATIONAL APPLICATION NO	INTERNATIONAL FILING DATE	PRIORITY DATE CLAIMED
PCT/EP99/08193	October 2,8 1999	October 28, 1998

TITLE OF INVENTION
Footwear Having a Sealed Sole Construction and a Method For the Production Thereof

APPLICANT(S) FOR DO/EO/US
Franz Haimerl, Alfons Meindl

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371
2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S C. 371
3. ☐ This is an express request to begin national examination procedures (35 U.S.C. 371(f)) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S C 371(b) and PCT Articles 22 and 39(1).
4. ☒ A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date
5. ☒ A copy of the International Application as filed (35 U.S.C. 371 (c) (2))
   a. ☐ is transmitted herewith (required only if not transmitted by the International Bureau).
   b. ☒ has been transmitted by the International Bureau.
   c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US).
6. ☒ A translation of the International Application into English (35 U.S.C 371(c)(2)).
7. ☐ A copy of the International Search Report (PCT/ISA/210)
8. ☒ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371 (c)(3))
   a. ☐ are transmitted herewith (required only if not transmitted by the International Bureau).
   b. ☐ have been transmitted by the International Bureau
   c. ☐ have not been made; however, the time limit for making such amendments has NOT expired
   d. ☒ have not been made and will not be made
9. ☐ A translation of the amendments to the claims under PCT Article 19 (35 U S C. 371(c)(3)).
10. ☐ An oath or declaration of the inventor(s) (35 U.S.C 371 (c)(4))
11. ☒ A copy of the International Preliminary Examination Report (PCT/IPEA/409).
12. ☐ A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U S C. 371 (c)(5)).

Items 13 to 18 below concern document(s) or information included:

13. ☐ An Information Disclosure Statement under 37 CFR 1 97 and 1 98
14. ☐ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
15. ☐ A **FIRST** preliminary amendment.
    A **SECOND** or **SUBSEQUENT** preliminary amendment.
16. ☐ A substitute specification.
17. ☐ A change of power of attorney and/or address letter
18. ☒ Certificate of Mailing by Express Mail
19. ☐ Other items or information.

PCTUS1/REV03

[redacted] ICATION NO (IF KNOWN, SEE 37 CFR 09/830814	INTERNATIONAL APPLICATION NO PCT/EP99/08193	ATTORNEY'S DOCKET NUMBER FA/220A

20. The following fees are submitted:		CALCULATIONS PTO USE ONLY	
BASIC NATIONAL FEE (37 CFR 1.492 (a) (1) - (5)) :			
☒ Search Report has been prepared by the EPO or JPO	**$840.00**		
☐ International preliminary examination fee paid to USPTO (37 CFR 1 482)	**$670.00**		
☐ No international preliminary examination fee paid to USPTO (37 CFR 1 482) but international search fee paid to USPTO (37 CFR 1 445(a)(2))	**$760.00**		
☐ Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2) paid to USPTO . .	**$970.00**		
☐ International preliminary examination fee paid to USPTO (37 CFR 1.482) and all claims satisfied provisions of PCT Article 33(2)-(4)	**$96.00**		
ENTER APPROPRIATE BASIC FEE AMOUNT =		**$840.00**	
Surcharge of **$130.00** for furnishing the oath or declaration later than ☐ 20 ☐ 30 months from the earliest claimed priority date (37 CFR 1.492 (e)).		**$0.00**	

CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE		
Total claims	52 - 20 =	32	x $18.00	**$576.00**	
Independent claims	4 - 3 =	1	x $78.00	**$78.00**	
Multiple Dependent Claims **(check if applicable)**.			☐	**$0.00**	
	TOTAL OF ABOVE CALCULATIONS =			**$1,494.00**	
Reduction of 1/2 for filing by small entity, if applicable Verified Small Entity Statement must also be filed (Note 37 CFR 1 9, 1.27, 1.28) **(check if applicable)**			☐	**$0.00**	
	SUBTOTAL =			**$1,494.00**	
Processing fee of **$130.00** for furnishing the English translation later than ☐ 20 ☐ 30 months from the earliest claimed priority date (37 CFR 1 492 (f)).			+	**$0.00**	
	TOTAL NATIONAL FEE =			**$1,494.00**	
Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3 31) **(check if applicable).**			☐	**$0.00**	
	TOTAL FEES ENCLOSED =			**$1,494.00**	
				Amount to be: refunded	$
				charged	$

☐ A check in the amount of to cover the above fees is enclosed

☒ Please charge my Deposit Account No **07-1729** in the amount of **$1,494.00** to cover the above fees.
A duplicate copy of this sheet is enclosed

☒ The Commissioner is hereby authorized to charge any fees which may be required, or credit any overpayment to Deposit Account No. **07-1729** A duplicate copy of this sheet is enclosed.

NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.

SEND ALL CORRESPONDENCE TO:

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Carol A. Lewis White
SIGNATURE

Carol A. Lewis White
NAME

33,306
REGISTRATION NUMBER

April 27, 2001
DATE

Attorney Docket No. FA/220A

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:
Haimerl et al.

Serial No.: 09/830,814

Filed: April 27, 2001

For: Footwear Having a Sealed Sole Construction and a Method For the Production Thereof

Group Art Unit:

Examiner:

I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to: Commissioner of Patents and Trademarks, Washington, DC 20231 on June 29, 2001

Darlene S. McGrath

Darlene S. McGrath

June 29, 2001

(date of mailing document)

Honorable Commissioner of
Patents and Trademarks
Washington, DC 20231

PRELIMINARY AMENDMENT

Dear Sir:

Please amend the the above-identified application as follows:

In the Claims:

Please amend claims 1-52 as follows:

1. (Amended) Footwear with a shank [(11)] and with a sole construction having an outsole [(19, 39)], in which

the shank [(11)] is constructed with an upper material [(13)] and with a water-tight functional layer [(15)] at least partially covering the upper material [(13)] on its inside and a shank end region on the sole side with an upper material end region [(21)] and a functional layer end region [(23)],

the outsole [(19]) is connected to the shank end region, the functional layer end region [(23)] has a projection [(25]) and a glue zone from a reactive hot-melt adhesive [(33)] that leads to water-tightness in the cured state, closed in the outsole peripheral direction, is applied to projection [(25)].

2. (Amended) Footwear according to Claim 1, in which the outsole [(19, 39)] is glued to the shank end region by means of outsole glue [(35]) applied to it.

3. (Amended) Footwear according to Claim 1 [or 2], in which the reactive hot-melt adhesive [(33)] extends over the entire projection width.

4. (Amended) Footwear according to [one of the] Claim[s] 1 [– 3], in which the shank end region extends essentially perpendicular to the tread surface of the outsole [(19, 39)], and the functional layer end region [(23)] protrudes in the direction toward the tread surface over the upper material end region [(21)].

5. (Amended) Footwear according to [one of the] Claim[s] 1 [– 3], in which the shank end region extends essentially parallel to the tread surface of outsole [(19, 39)], and the functional layer end region [(23)] protrudes above the upper material end region [(21)] in the direction toward the center of the outsole.

6. (Amended) Footwear according to [one of the] Claim[s] 1 [to 5], with an insole [(17)], to which the functional layer end region [(23)] is attached.

7. (Amended) Footwear according to Claim 6, in which the functional layer end region [(23)] is joined to the insole [(17)] by means of a seam [(31)].

8. (Amended) Footwear according to Claim 5, in which the functional layer end region [(23)] is held essentially parallel to the tread surface of outsole [(19, 39)] by means of a string lasting [(45)].

9. (Amended) Footwear according to [one of the] Claim[s] 1 [– 8], in which the upper material end region [(21)] is fastened to the functional layer [(23)] by means of fixation glue [(43)].

10. (Amended) Footwear according to [one of the] Claim[s] 1 [– 9], in which the projection [(24)] is bridged by a connection strip made of a material permeable to the liquid reactive hot-melt adhesive [(33)], and the reactive hot-melt adhesive [(33)] is applied to the outside of the connecting strip.

11. (Amended) Footwear according to Claim 10, in which the connecting strip is constructed with a mesh strip [(27)].

12. (Amended) Footwear according to Claim 11, in which a first long side of the mesh strip [(27)] is fastened to the upper material end region [(21)].

13. (Amended) Footwear according to Claim 12, in which the first long side of the mesh strip [(27)] is stitched to the upper material end region [(21)].

14. (Amended) Footwear according to [one of the] Claim[s] 11 [to 13], in which a second long side of the mesh strip [(27)] is fastened to the functional layer end region [(23)].

15. (Amended) Footwear according to Claim 14, in which the second long side of the mesh strip [(27)] is stitched to the functional layer end region [(23)].

16. (Amended) Footwear according to [one of the] Claim[s] 12 [– 15], in which the second long side of the mesh strip [(27)] is fastened to the end sole [(17)].

17. (Amended) Footwear according to Claim 16, in which the second long side of the mesh strip [(27)] is stitched to the insole [(17)].

18. (Amended) Footwear according to [one of the] Claim[s] 12 [– 15], in which the second long side of the mesh strip [(27)] is fastened to the string lasting [(45)] holding the functional layer end region [(23)].

19. (Amended) Footwear according to Claim 18, in which the second long side of the mesh strip [(27)] is stitched to the string lasting [(45)] holding the functional layer end region [(23)].

20. (Amended) Footwear according to [one of the] Claim[s] 8 [– 14 and 17 – 19], in which the upper material end region [(21)] is held parallel to the tread surface of the outsole [(19, 39)] by means of a second string lasting [(47)].

21. (Amended) Footwear according to [one of the] Claim[s] 1 [– 20], in which the functional layer [(15)] is constructed with a water-tight and water vapor-permeable functional layer.

22. (Amended) Footwear according to Claim 21, with a functional layer [(15)] constructed with expanded microporous polytetrafluoroethylene.

23. (Amended) Footwear according to [one of the] Claim[s] 1 [– 22], in which the outsole [(19)] has an essentially shell shape with a plate-like tread surface region and a shell edge [(40)] protruding essentially perpendicular from it.

24. (Amended) Footwear according to [one of the] Claim[s] 5 [– 22], in which the outsole [(39)] has essentially a plate shape.

25. (Amended) Method for production of footwear with the following manufacturing steps:

a shank [(11)] is created, which is constructed with an upper material [(13)] and with a water-tight functional layer [(15)] that at least partially covers the upper material [(13)] on its inside and is provided with a shank end region on the sole side;

the upper material [(13)] is provided with an upper material end region [(21)] on the sole side, and the functional layer [(15)] is provided with a functional layer end region [(23)] on the sole side,

in which the functional layer end region [(23)] is provided with a projection [(25)] that extends above the upper material end region [(21)];

a glue zone from a reactive hot-melt adhesive [(33)] that leads to water-tightness in the cured state and closed in the sole peripheral direction is applied to the projection [(25)];

an outsole [(19, 39)] is attached to the shank end region.

26. (Amended) Method according to Claim 25, in which the projection [(25)] is bridged by a connecting strip made of a material permeable to the liquid

reactive hot-melt adhesive [(33)], and the reactive hot-melt adhesive [(33)] is applied to an outside of the mesh strip [(27)].

27. (Amended) Method according to Claim 26, in which a connecting strip is applied with a mesh strip [(27)].

28. (Amended) Method according to Claim 27, in which a first long side of mesh strip [(27)] is stitched to the upper material end region [(21)] and a second long side of mesh strip [(27)] is stitched to the functional layer end region [(23)].

29. (Amended) Method according to [one of the] Claim[s] 28 [– 28], in which the sole construction is provided with an insole [(17)].

30. (Amended) Method according to [one of the] Claim[s] 26 [– 29], in which the second long side of the mesh strip [(27)] is stitched to the insole [(17)].

31. (Amended) Method according to [one of the] Claim[s] 25 [– 28], in which the functional layer end region [(23)] is stretched by means of a string lasting [(45)] essentially parallel to the tread surface of outsole [(19, 39)].

32. (Amended) Method according to Claim 31, in which, during production of footwear with a mesh strip [(27)], the second long side of the mesh strip [(27)] is stitched to the string lasting [(45)].

33. (Amended) Method according to Claim 31 [or 32], in which the upper material end region [(21)] is stretched by means of a second string lasting [(47)] essentially parallel to the tread surface of outsole [(19, 39)].

34. (Amended) Method according to [one of the] Claim[s] 25 [– 33], in which the reactive hot-melt adhesive [(33)], after application on projection [(25)] and mesh strip [(27)], is pressed with a pressing device [(53)], with a pressing surface that does not adhere to the reactive hot-melt adhesive [(33)], on the surface of the projection [(25)] and the mesh strip [(27)].

35. (Amended) Method according to [one of the] Claim[s] 25 [– 34], in which a reactive hot-melt adhesive [(33)], curable by means of moisture, is used, which is applied to the region being sealed and exposed to moisture for curing.

36. (Amended) Method according to Claim 35, in which a thermally activatable reactive hot-melt adhesive [(33)], curable with moisture, is used, which is thermally activated, applied to the region being sealed and exposed to moisture for curing.

37. (Amended) Method according to [one of the] Claim[s] 25 [– 36], in which a water-tight and water vapor-permeable functional layer [(15)] is used.

38. (Amended) Method according to Claim 37 in which a functional layer [(15)] constructed with expanded microporous polytetrafluoroethylene is used.

39. (Amended) Sealed shoe with a shank and insole [(1)], to which the shank is connected, in which reactive hot-melt adhesive [(3)] based on polyurethane is applied over the surface and pressed on the shoe bottom in the region of insole [(1)] and the shank part connected to it.

40. (Amended) Shoe according to Claim 39, in which an open-pore, glue-compatible material [(4)] is applied over the entire shoe and the side region.

41. (Amended) Shoe according to Claim 39, in which an open-pore, glue-compatible material [(4)] is applied over a part of the shoe and the side region.

42. (Amended) Shoe according to [one of the] Claim[s] 39 [to 41], in which the surface of the open-pore, glue-compatible material [(4)] is glued flush in the reactive hot-melt adhesive [(3)].

43. (Amended) Shoe according to [one of the] Claim[s] 39 [to 42], in which the shoe bottom to be further processed has a flat and uniform surface.

44. (Amended) Shoe according to [one of the] Claim[s] 39 [to 43], in which the shank is joined to the insole [(1)] by glue lasting.

45. (Amended) Shoe according to Claim 44, in which the reactive hot-melt adhesive [(3)] is applied on a width of about 1 cm overlapping between the insole [(1)] and lasted shank.

46. (Amended) Method for production of a shoe with a shank and an insole [(1)], in which the shank is joined to the insole [(1)], and reactive hot-melt adhesive [(3)] based on polyurethane is applied over the surface and pressed on the shoe bottom in the region of insole [(1)] and the shank part connected to it.

47. (Amended) Method according to Claim 46, in which an open-pore, glue-compatible material [(4)] is applied over the entire shoe and the side region.

48. (Amended) Method according to Claim 47, in which an open-pore, glue-compatible material [(4)] is applied over a part of the shoe and the side region.

49. (Amended) Method according to [one of the] Claim[s] 46 [to 48], in which the surface of the open-pore, glue-compatible material [(4)] is glued flush in the reactive hot-melt adhesive [(3)].

50. (Amended) Shoe according to [one of the] Claim[s] 46 [to 49], in which the shoe bottom to be further processed is provided with a flat and uniform surface.

51. (Amended) Method according to [one of the] Claim[s] 46 [to 50], in which the shank is joined to the insole [(1)] by glue lasting.

52. (Amended) Method according to Claim 51, in which the reactive hot-melt adhesive [(3)] is applied on a width of about 1 cm overlapping between the insole [(1)] and the lasted shank.

REMARKS

It is believed that the Amendment places the application in better condition for examination, and therefore, its entry is appropriate.

Respectfully submitted,

Carol A. Lewis White

Carol A. Lewis White, 33,306
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(302) 738-4880

Date: June 29, 2001

Enclosure: Clean Copy of Amended Claims

Clean Copy of Amended Claims:

1. Footwear with a shank and with a sole construction having an outsole, in which

the shank is constructed with an upper material and with a water-tight functional layer at least partially covering the upper material on its inside and a shank end region on the sole side with an upper material end region and a functional layer end region,

the outsole is connected to the shank end region, the functional layer end region has a projection and a glue zone from a reactive hot-melt adhesive that leads to water-tightness in the cured state, closed in the outsole peripheral direction, is applied to projection.

2. Footwear according to Claim 1, in which the outsole is glued to the shank end region by means of outsole glue applied to it.

3. Footwear according to Claim 1, in which the reactive hot-melt adhesive extends over the entire projection width.

4. Footwear according to Claim 1, in which the shank end region extends essentially perpendicular to the tread surface of the outsole, and the functional layer end region protrudes in the direction toward the tread surface over the upper material end region.

5. Footwear according to Claim 1, in which the shank end region extends essentially parallel to the tread surface of outsole, and the functional layer end region protrudes above the upper material end region in the direction toward the center of the outsole.

6. Footwear according to Claim 1, with an insole, to which the functional layer end region is attached.

7. Footwear according to Claim 6, in which the functional layer end region is joined to the insole by means of a seam.

8. Footwear according to Claim 5, in which the functional layer end region is held essentially parallel to the tread surface of outsole by means of a string lasting.

9. Footwear according to Claim 1, in which the upper material end region is fastened to the functional layer by means of fixation glue.

10. Footwear according to Claim 1, in which the projection is bridged by a connection strip made of a material permeable to the liquid reactive hot-melt adhesive, and the reactive hot-melt adhesive is applied to the outside of the connecting strip.

11. Footwear according to Claim 10, in which the connecting strip is constructed with a mesh strip.

12. Footwear according to Claim 11, in which a first long side of the mesh strip is fastened to the upper material end region.

13. Footwear according to Claim 12, in which the first long side of the mesh strip is stitched to the upper material end region.

14. Footwear according to Claim 11, in which a second long side of the mesh strip is fastened to the functional layer end region.

15. Footwear according to Claim 14, in which the second long side of the mesh strip is stitched to the functional layer end region.

16. Footwear according to Claim 12, in which the second long side of the mesh strip is fastened to the end sole.

17. Footwear according to Claim 16, in which the second long side of the mesh strip is stitched to the insole.

18. Footwear according to Claim 12, in which the second long side of the mesh strip is fastened to the string lasting holding the functional layer end region.

19. Footwear according to Claim 18, in which the second long side of the mesh strip is stitched to the string lasting holding the functional layer end region.

20. Footwear according to Claim 8, in which the upper material end region is held parallel to the tread surface of the outsole by means of a second string lasting.

21. Footwear according to Claim 1, in which the functional layer is constructed with a water-tight and water vapor-permeable functional layer.

22. Footwear according to Claim 21, with a functional layer constructed with expanded microporous polytetrafluoroethylene.

23. Footwear according to Claim 1, in which the outsole has an essentially shell shape with a plate-like tread surface region and a shell edge protruding essentially perpendicular from it.

24. Footwear according to Claim 5, in which the outsole has essentially a plate shape.

25. Method for production of footwear with the following manufacturing steps:

a shank is created, which is constructed with an upper material and with a water-tight functional layer that at least partially covers the upper material on its inside and is provided with a shank end region on the sole side;

the upper material is provided with an upper material end region on the sole side, and the functional layer is provided with a functional layer end region on the sole side,

in which the functional layer end region is provided with a projection that extends above the upper material end region;

a glue zone from a reactive hot-melt adhesive that leads to water-tightness in the cured state and closed in the sole peripheral direction is applied to the projection;

an outsole is attached to the shank end region.

26. Method according to Claim 25, in which the projection is bridged by a connecting strip made of a material permeable to the liquid reactive hot-melt adhesive, and the reactive hot-melt adhesive is applied to an outside of the mesh strip.

27. Method according to Claim 26, in which a connecting strip is applied with a mesh strip.

28. Method according to Claim 27, in which a first long side of mesh strip is stitched to the upper material end region and a second long side of mesh strip is stitched to the functional layer end region.

29. Method according to Claim 28, in which the sole construction is provided with an insole.

30. Method according to Claim 26, in which the second long side of the mesh strip is stitched to the insole.

31. Method according to Claim 25, in which the functional layer end region is stretched by means of a string lasting essentially parallel to the tread surface of outsole.

32. Method according to Claim 31, in which, during production of footwear with a mesh strip, the second long side of the mesh strip is stitched to the string lasting.

33. Method according to Claim 31, in which the upper material end region is stretched by means of a second string lasting essentially parallel to the tread surface of outsole.

34. Method according to Claim 25, in which the reactive hot-melt adhesive, after application on projection and mesh strip, is pressed with a pressing device, with a pressing surface that does not adhere to the reactive hot-melt adhesive, on the surface of the projection and the mesh strip.

35. Method according to Claim 25, in which a reactive hot-melt adhesive, curable by means of moisture, is used, which is applied to the region being sealed and exposed to moisture for curing.

36. Method according to Claim 35, in which a thermally activatable reactive hot-melt adhesive, curable with moisture, is used, which is thermally activated, applied to the region being sealed and exposed to moisture for curing.

37. Method according to Claim 25, in which a water-tight and water vapor-permeable functional layer is used.

38. Method according to Claim 37 in which a functional layer constructed with expanded microporous polytetrafluoroethylene is used.

39. Sealed shoe with a shank and insole, to which the shank is connected, in which reactive hot-melt adhesive based on polyurethane is applied over the surface and pressed on the shoe bottom in the region of insole and the shank part connected to it.

40. Shoe according to Claim 39, in which an open-pore, glue-compatible material is applied over the entire shoe and the side region.

41. Shoe according to Claim 39, in which an open-pore, glue-compatible material is applied over a part of the shoe and the side region.

42. Shoe according to Claim 39, in which the surface of the open-pore, glue-compatible material is glued flush in the reactive hot-melt adhesive.

43. Shoe according to Claim 39, in which the shoe bottom to be further processed has a flat and uniform surface.

44. Shoe according to Claim 39, in which the shank is joined to the insole by glue lasting.

45. Shoe according to Claim 44, in which the reactive hot-melt adhesive is applied on a width of about 1 cm overlapping between the insole and lasted shank.

46. Method for production of a shoe with a shank and an insole, in which the shank is joined to the insole, and reactive hot-melt adhesive based on polyurethane is applied over the surface and pressed on the shoe bottom in the region of insole and the shank part connected to it.

47. Method according to Claim 46, in which an open-pore, glue-compatible material is applied over the entire shoe and the side region.

48. Method according to Claim 47, in which an open-pore, glue-compatible material is applied over a part of the shoe and the side region.

49. Method according to Claim 46, in which the surface of the open-pore, glue-compatible material is glued flush in the reactive hot-melt adhesive.

50. Shoe according to Claim 46, in which the shoe bottom to be further processed is provided with a flat and uniform surface.

51. Method according to Claim 46, in which the shank is joined to the insole by glue lasting.

52. Method according to Claim 51, in which the reactive hot-melt adhesive is applied on a width of about 1 cm overlapping between the insole and the lasted shank.

FOOTWEAR HAVING A SEALED SOLE CONSTRUCTION AND A METHOD FOR THE PRODUCTION THEREOF

AREA OF THE INVENTION

The invention concerns a shoe sealing system and sealing method for a sealed shoe with a shank and insole, to which the shank is connected, and especially with a shank provided at least partially with a water-tight functional layer, which is preferably water vapor-permeable, and with an outsole, especially a glued-on outsole. The invention also concerns the method for production of such a shoe.

BACKGROUND OF THE INVENTION

There are shoes that are tight in the shank area, for example, by covering of the shank upper material with a water-tight layer. This is preferably a water vapor-permeable functional layer, by means of which water-tightness is achieved, while maintaining breathability, i.e., water vapor-permeability. The functional layer is often part of a functional layer laminate, which has at least one textile layer, in addition to the functional layer.

Special efforts are required to ensure permanent water-tightness in the region between the shank end on the sole side and the sole construction.

To achieve this, sock-like inserts, also called booties in technical circles, have been used between the shank and sole construction, on the one hand, and an inner liner, on the other. Since such booties are shaped by joining of cut parts, they require no stitching holes. However, the use of booties is quite demanding in production, if the booties are to correspond, to some degree, to the corresponding shoe shape.

Another known method consists of sealing the lower region of the shoe construction, and thus the lower region of the shank covered with the functional layer and optionally stitched to an insole, with the outsole material of a molded-on outsole. However, it cannot be prevented that

water will reach the end of the shank on the sole side, and thus the end of the functional layer on the sole side, in the upper material of the shank that conducts water generally via capillary effects, and via water bridges, especially in the form of textile fibers on the cut edge of the shank end on the sole side, will reach the generally very strongly water-absorbent inner lining situated on the inside of the functional layer.

This problem has been overcome with a sole construction known from EP 0 298 360 B1, in which the functional layer in the region of the shank end on the sole side has a projection relative to the upper material, which is bridged with a mesh strip, one side of which is stitched to the upper material and the other side to the functional layer and to the insole. The projection of the functional layer is then sealed by the outsole material, which penetrated the mesh strip during molding, when it is fluid. The mesh strip represents a barrier for water that already penetrated along the upper material to beneath the region of the shank end on the sole side covered by the outsole, especially when a monofil mesh strip is involved, so that such water cannot penetrate up to the cut edge of the functional layer on the sole side and thus to the inner liner of the footwear.

This mesh strip solution has proven extremely successful. Since, in this case, sealing of the end region of the functional layer on the sole side requires molding-on of an outsole, this known method is restricted to shoes with molded-on outsoles and cannot be used for shoes with glued-on outsoles. It is therefore not available for shoes of elegant style. Molding-on of outsoles requires high mold costs, which lead to long depreciation time and require correspondingly large numbers of produced pieces of the corresponding shoe type and the corresponding shoe size.

Shoe designs are known, in which the functional layer also has a projection above the upper material in the end region on the sole side, but in which no mesh strip is present. The outsole material here is directly molded onto the functional layer in the region of the projection. This method is also suitable only for footwear with molded-on outsoles.

SUMMARY OF THE INVENTION

With the invention, a shoe is made available that can be made water-tight with relatively simple means and at limited cost.

Moreover, footwear is to be made available with the invention, in which the shank end region on the sole side can be made permanently water-tight in any outsole with the lowest possible expense, and with the fewest possible process steps.

A sealed shoe according to a first aspect of the invention has a shank and an insole, to which the shank is connected, in which a reactive hot-melt adhesive based on polyurethane is applied over the surface and pressed onto the shoe bottom in the region of the insole and the shank part connected to it.
According to the invention, a method for its production is also offered, in which the shank is connected to the outsole, and reactive hot-melt adhesive based on polyurethane is applied over the surface onto the shoe bottom in the region of the insole and the shank part connected to it and pressed. The dependent patent claims mention variants of this.

In a shoe according to the invention, reactive hot-melt adhesive based on polyurethane is applied over the surface and pressed onto the shoe bottom in the region of the insole and the shank part connected to it.

Shoe bottom, in this context, means the bottom of the shoe before an outsole is applied.

Reactive hot-melt adhesive is an adhesive that leads to water-tightness in the reacted state. In a shoe according to the invention, this causes sealing in the region of the sole construction.

In one variant of the invention, open-pore, glue-compatible material is applied over the entire shoe and the side region or parts of it. An upper material, like leather, nonwoven, felt or similar material, is preferably used as such material. This material is preferably glued flush in the reactive hot-melt adhesive. This means that the surfaces of the upper material facing away from

the insole and the surface of the reactive hot-melt adhesive facing away from the insole are essentially flush with each other. In this manner, a situation is achieved in which the shoe bottom (in the aforementioned sense) has a flat and uniform surface, which facilitates gluing-on of an outsole.

In one variant of the invention, the shank part of the shoe on the sole side is connected to the insole by glue lasting. This means a last insert region of the shank part on the sole side, pulled over the edge of the insole on its bottom facing the later outsole, is attached on a peripheral region of the bottom of the insole by gluing. After glue lasting, the reactive hot-melt adhesive is then applied to the shoe bottom (in the aforementioned sense), in order to seal the shoe bottom before application of an outsole.

In the case of a glue-lasted shoe, the reactive hot-melt adhesive is preferably applied on a width of about 1 cm overlapping between the insole and lasted shank. This achieves a situation in which the inside periphery of the last insert is reliably sealed by the reactive hot-melt adhesive.

In one variant of the invention, the reactive hot-melt adhesive is applied to the entire bottom of the insole not covered by the last insert and the mentioned overlapping region with the last insert.

In the invention, in addition to glue lasting with a lasting glue, additional, sealing gluing with the reactive hot-melt adhesive therefore occurs.

To produce shoes according to the invention, the usual glue lasting process without modification can be employed. To obtain water-tightness in the region of the sole construction, only the reactive hot-melt adhesive need be applied to the shoe bottom still not provided with an outsole. The water-tightness is therefore achieved at very limited additional expense.

According to another aspect, the invention concerns footwear with a shank, and with a sole construction having an outsole, in which the shank is constructed with an upper material and with a water-tight functional layer that at least partially covers the upper material on its inside, and a shank end region on the sole side with an upper material end region and a functional layer

end region, the outsole is connected to the shank end region, the functional layer end region has a projection extending above the upper material end region, and a glue zone closed in the peripheral direction of the outsole from a reactive hot-melt adhesive that leads to water-tightness in the reacted state is applied to the projection.

According to this aspect, the invention also concerns a method for production of footwear with the following manufacturing steps: a shank is created, which is constructed with an upper material and with a water-tight functional layer that at least partially covers the upper material on its inside and is provided with a shank end region on the sole side; the upper material is provided with an upper material end region on the sole side, and the functional layer is provided with the functional layer end region on the sole side, the functional layer end region being provided with a projection that extends above the upper material end region; a closed glue zone in the sole peripheral direction is applied to the projection from a reactive hot-melt adhesive that leads to water-tightness in the reacted state; an outsole is attached to the shank end region.

Advantageous modifications are stated in the dependent claims.

Both aspects can be advantageously combined, i.e., the reactive hot-melt adhesive can cover the entire shoe bottom, and also the projection.

The footwear according to the invention has a shank and an outsole, the shank being constructed with an upper material and with a water-tight functional layer that at least partially covers the upper material on its inside, and has a shank end region on the sole side with an upper material end region and a functional layer end region. The outsole is connected to the shank end region. The functional layer end region has a projection that extends above the upper material end region. A glue zone from a reactive hot-melt adhesive that leads to water-tightness in the reacted state is applied to the projection, closed in the peripheral direction of the outsole.

The sealing function, which is achieved in the ordinary footwear of the aforementioned type with the outsole material, is produced in the footwear according to the invention by the reactive hot-melt adhesive applied to the projection of the functional layer end region, which, on the one

hand, in the liquid state before curing, has particularly high creep capability and, on the other hand, leads to particularly high and permanent water-tightness in the cured state. The reactive hot-melt adhesive can be applied by very simple means, for example, spread, sprayed or applied in the form of a glue strip or glue bead, in which the reactive hot-melt adhesive is made adhesive by heating and, in so doing, can be attached to the projection before curing, and the accompanying permanent bonding with the functional layer begins in the region of its projection.

The water-tightness of the sole construction of water-tight footwear with any desired outsole is therefore achieved in extremely simple fashion with extremely simple process steps. The method according to the invention therefore leads to low manufacturing costs for water-tight shoes.

In one variant according to the second aspect of the invention, the shank end region extends essentially perpendicular to the tread surface of the outsole (also referred to below as vertical extent), and the functional layer end region protrudes over the upper material end region in the direction toward the tread surface. In another variant of the invention, the shank end region extends essentially parallel to the tread surface of the outsole (also referred to as horizontal extent below), and the functional layer end region protrudes above the upper material end region in the direction toward the center of the outsole. The first variant is particularly suited for shell-like outsoles that have an edge protruding perpendicular to the tread surface of the outsole. The latter variant is particularly suited for shoes with flat, plate-like outsoles, as used in more elegant shoes.

In one variant according to the second aspect of the invention, the projection is bridged by means of a connecting strip, one long side of which is connected to the upper material end region, and the other long side of which to the functional layer end region. In another variant of the invention, there is no such bridging of the projection.

The reactive hot-melt adhesive is applied either in the region of the projection directly to the functional layer, if no connecting strip is present, or it is applied to the outside of the connecting strip covering the projection, if a connecting strip is present. In order for sealing of the

functional layer with the reactive hot-melt adhesive to occur in the latter case, a material is chosen for the connecting strip that is permeable to the reactive hot-melt adhesive, liquid or made liquid, before curing.

The presence of such a connecting strip, on the one hand, permits permanent water-tight sealing between the functional layer end region and the glued-on outsole and, on the other hand, permits the tensile forces that are exerted on the functional layer during stretching of the functional layer end region over the last, for example, by means of string lasting or by means of collet chucks, to be led fully or at least partially to the upper material, instead of allowing them to act exclusively on the less loadable functional layer.

The connecting strip is preferably constructed with open mesh material, formed from thermoplastic mesh material or textile material, preferably monofil textile material. However, the connecting strip can have any other shape, for example, be formed with staples, large-loop or long stitches or similar structures. The connecting strip is supposed to mainly fulfill the task of permitting adequate flow of the liquid reactive hot-melt adhesive for permanent water-tight sealing of the functional layer and to permit unloading of the functional layer and transfer or distribution of the load between the upper material and insole material (during lasting) or string lasting.

A mesh strip from Grebrüder Jaeger GmbH & Co. in Wuppertal, Germany, with Article Number 23851, is suitable for the footwear according to the invention.

The invention is suitable for footwear with or without an insole. In the latter case, the functional layer end region on the sole side is lashed together by string lasting. The upper material end region is then glued or stitched to the functional layer end region, optionally via a mesh strip, or the functional layer end region and the upper material end region are lashed together by string lasting.

In a variant of the invention with a mesh strip, its one long side is connected to the upper material end region and its other long side is connected to the functional layer end region and optionally to the insole, preferably by stitching.

The procedure is as follows in a method according to the invention to produce footwear according to the invention: a shank is created, which is constructed with an upper material and a water-tight functional layer that at least partially covers the upper material on its inside, and provided with a shank end region on the sole side. The upper material is provided with an upper material end region on the sole side, and the functional layer is provided with a functional layer end region on the sole side, in which the functional layer end region is provided with a projection that extends above the upper material end region. A closed glue zone in the peripheral direction of the outsole is applied to the projection from a reactive hot-melt adhesive, which leads to water-tightness in the reacted state. An outsole is fastened to the shank end region.

Gluing of the reactive adhesive to the functional layer is particularly intimate, if the reactive adhesive is forced mechanically against the functional layer after application onto the projection. A pressing device is preferably suitable for this, for example, in the form of a pressure cushion with a smooth material surface that is not wettable by the reactive hot-melt adhesive and therefore not adherent to the reactive hot-melt adhesive, for example, made of a nonporous polytetrafluoroethylene (also known under the tradename Teflon). A pressure cushion is preferably used for this purpose, for example, in the form of a rubber cushion or air cushion, whose pressing surface is coated with a film from the mentioned material, for example, nonporous polytetrafluoroethylene, or such a film is arranged before the pressing process between the sole construction provided with the reactive hot-melt adhesive and the pressure cushion.

In one variant of the invention, the outsole is glued-on with ordinary solvent adhesive or hot adhesive, in which an adhesive based on polyurethane is involved, for example. A solvent adhesive is an adhesive that has been made tacky by addition of an evaporable solvent and cures because of evaporation of the solvent. A hot adhesive is an adhesive, also called a thermoplastic

adhesive, which is brought to the tacky state by heating and cures by cooling. Such an adhesive can be repeatedly brought to the tacky state by reheating.

A reactive hot-melt adhesive that is curable with moisture is preferably used, which is applied to the region being glued and exposed to moisture for curing. In one variant of the invention, a heat-activatable and moisture-curable reactive hot-melt adhesive is used, which is thermally activated, applied to the region being glued and exposed to moisture for curing.
Production of shoes according to the invention is particularly simple and economical during use a reactive hot-melt adhesive that is thermally activatable and can be brought to the curing reaction by moisture, for example, steam.

A foaming reactive hot-melt adhesive can also be used, if one intends to use its increased volume, which makes it particularly suitable for filling up cavities and penetrating into gaps or niches that can form in the mesh strip region. A particularly reliable water-tightness can be produced on this account. Foaming can be achieved by swirling the reactive hot-melt adhesive during application with a gas, which can be a mixture of nitrogen and oxygen, for example.

Adhesives that consist, before activation, of relatively short molecular chains with an average molecular weight in the range from about 3,000 to about 5,000 g/mol, are nontacky and are optionally brought to a state of reaction after thermal activation, in which the relatively short molecular chains crosslink to long molecular chains and, in so doing, cure, primarily in a moist atmosphere, are referred to as reactive hot-melt adhesives. They are tacky in the reaction or curing period. After crosslinking curing, they cannot be reactivated. During curing, three-dimensional crosslinking of the molecular chains occurs. Three-dimensional crosslinking leads to particularly strong protection against penetration of water into the adhesive.

Polyurethane reactive hot-melt adhesives, resins, aromatic hydrocarbon resins, aliphatic hydrocarbon resins and condensation resins, for example, in the form of epoxy resins, are suitable, for example, for the purpose according to the invention.

Polyurethane reactive hot-melt adhesives, hereafter called PU reactive hot-melt adhesives, are particularly preferred.

The crosslinking reaction of PU reactive hot-melt adhesives that causes curing is ordinarily produced by moisture, for which atmospheric moisture is sufficient. There are blocked PU reactive hot-melt adhesives, whose crosslinking reaction can only begin after activation of the PU reactive hot-melt adhesive by thermal energy, so that such hot-melt adhesives can be stored in the open, i.e., in surroundings with atmospheric moisture. On the other hand, there are unblocked PU reactive hot-melt adhesives, in which a crosslinking reaction already occurs at room temperature, if they are found in surroundings with atmospheric moisture. The latter reactive hot-melt adhesives must be stored protected from atmospheric moisture, as long as the crosslinking action is not supposed to occur.

Both types of PU reactive hot-melt adhesives are ordinarily available in the unreacted state in the form of rigid blocks. Before application onto the regions being glued, the reactive hot-melt adhesive is heated, in order to melt it and thus make it spreadable or applicable. In the case of use of unblocked reactive hot-melt adhesive, such heating must occur with exclusion of atmospheric moisture. During use of blocked reactive hot-melt adhesive, this is not necessary, but it must be ensured that the heating temperature remains below the deblocking activation temperature.

In one variant of the invention, PU reactive hot-melt adhesives constructed with blocked or capped isocyanate is used. To overcome isocyanate blocking and therefore to activate the reactive hot-melt adhesive constructed with blocked isocyanate, thermal activation must be conducted. Activation temperatures for such PU reactive hot-melt adhesives lie roughly in the range from 70°C to 180°C.

In another variant of the invention, unblocked PU reactive hot-melt adhesive is used. The crosslinking reaction can be accelerated by heat supply.

In a practical variant of the method according to the invention, a PU reactive hot-melt adhesive, available under the name IPATHERM S 14/242 from H. P. Fuller in Wells, Austria is used. In another variant of the invention, a PU reactive hot-melt adhesive available under the name Macroplast QR 6202 from Henkel AG, Düsseldorf, Germany is used.

A functional layer that is not only water-impermeable, but also water vapor-permeable, is particularly preferred. This permits production of water-tight shoes that remain breathable, despite water-tightness.

A functional layer is considered "water-tight", optionally including the stitches provided in the functional layer, if it guarantees a water penetration pressure of at least $1.3 \cdot 10^4$ Pa. The functional layer material preferably guarantees a water penetration pressure of more than $1 \cdot 10^5$ Pa. The water penetration pressure is to be measured according to a test method, in which distilled water is applied at 20 ± 2°C to a sample of 100 cm^3 of the functional layer with increasing pressure. The pressure increase of the water is 60 ± 3 cm H_2O per minute. The water penetration pressure then corresponds to the pressure at which water first appears on the other side of the sample. Details about the procedure are provided in ISO Standard 0811 from 1981.

A "functional layer" is considered water vapor-permeable if it has a water vapor-permeability number Ret of less than 150 $m^2 \cdot Pa \cdot W^{-1}$. The water vapor-permeability is tested according to the Hohenstein skin model. This test method is described in DIN EN 31092 (02/94) or ISO 11092 (19/33).

Whether a shoe is water-tight can be tested, for example, with a centrifuge arrangement of the type described in US-A-5 329 807. A centrifuge arrangement described there has four pivotable holding baskets to hold footwear. Two or four shoes or boots can be tested simultaneously with it. In this centrifuge arrangement, centrifugal forces are employed that are produced by rapid centrifuging of the footwear to find water-permeable sites. Before centrifuging, water is filled into the inner space of the footwear. On the outside of the footwear, an absorbent material, like blotting paper or a paper towel, is arranged. The centrifugal forces exert pressure on the water

filled into the footwear, which causes the water to reach the absorbent material, if the footwear is permeable.

In such a water-tightness test, water is initially filled into the footwear. In footwear with an upper material that does not exhibit sufficient intrinsic rigidity, a stiff material is arranged in the shank internal space for stabilization, in order to prevent collapse of the shank during centrifuging. Blotting paper or a paper towel, on which the footwear being tested is placed, is found in the corresponding holding basket. The centrifuge is then rotated for a specified time. The centrifuge is then stopped and the blotting paper or paper towel examined as to whether it is moist. If it is moist, the tested footwear has not passed the water-tightness test. If it is dry, the tested footwear has passed the test and is classified as water-tight.

The pressure that the water exerts during centrifuging depends on the effective shoe surface, dependent on shoe size (sole inside surface), the weight of the amount of water filled into the footwear, the effect of centrifuge radius and the centrifuge speed.

Appropriate materials for a water-tight, water vapor-permeable functional layer include polyurethane, polypropylene and polyester, including polyether esters and their laminates, as described in the documents US-A-4,725, 418 and US-A-4,493,870. However, expanded microporous polytetrafluoroethylene is particularly preferred (ePTFE), as described in documents US-A-3,953,566 and US-A-4,187,390, and expanded polytetrafluoroethylene provided with hydrophilic impregnating agents and/or hydrophilic layers; see, for example, document US-A-4,194,041. A microporous functional layer is understood to mean a functional layer whose average pore size lies between about 0.2 μm and about 0.3 μm.

The pore size can be measured with a Coulter porometer (tradename), which is manufactured by Coulter Electronics, Inc., Hialeah, Florida, USA.

The Coulter porometer is a measurement instrument that yields automatic measurement of pore size distribution in porous media, in which the liquid penetration method is used (described in ASTM Standard E 1298-89).

The Coulter porometer determines the pore size distribution of a sample by increasing air pressure directed onto the sample and measurement of the resulting flow. This pore size distribution is a gauge of the degree of uniformity of the pores of the sample (i.e., a narrow pore size distribution means that there is a limited difference between the smallest pore size and the largest pore size). It is determined by dividing the maximum pore size by the minimum pore size.

The Coulter porometer also calculates the pore size for average flow. By definition, half of the flow through the porous sample occurs through pores whose pore size lies above or below this pore size for average flow.

If ePTFE is used as functional layer, the reactive hot-melt adhesive can penetrate during the gluing process into the pores of this functional layer, which leads to mechanical anchoring of the reactive hot-melt adhesive in this functional layer. The functional layer consisting of ePTFE can be provided with a thin polyurethane layer, on the side with which it comes in contact with the reactive hot-melt adhesive during the gluing process, with a thin polyurethane layer. During use of PU reactive hot-melt adhesive in conjunction with such a functional layer, not only does mechanical bonding occur, but also chemical bonding between the PU reactive hot-melt adhesive and the PU layer on the functional layer. This leads to particularly intimate gluing between the functional layer and the reactive hot-melt adhesive, so that a particularly durable water-tightness is guaranteed.

Leather or textile fabrics are suitable as upper material. Textile fabrics can include woven, knitted, mesh, nonwoven fabrics or felt. These textile fabrics can be produced from natural fibers, for example, from wool or viscose, from synthetic fibers, for example, from polyesters, polyamides, polypropylenes or polyolefins, or from blends of at least two such materials.

A liner material is normally arranged on the inside of the upper material for the shank. The same materials as stated above for the upper material are suitable for this purpose.

During use of a functional layer, a liner material is normally arranged on the inside. The same materials as mentioned above for the upper material are suitable as liner material, which is often joined to the functional layer into a functional layer laminate. The functional layer laminate can also have more than two layers, in which a textile backing can be found on the side of the functional layer lying away from the liner layer.

The outsole of the footwear according to the invention can consist of a water-tight material, like rubber or plastic, for example, polyurethane, or from a nonwater-tight, but breathable material, like leather or leather provided with rubber or plastic tarsia. In the case of nonwater-tight outsole the material, the outsole can be made water-tight, while maintaining breathability, in that it is provided with a water-tight, water vapor-permeable functional layer, at least at the sites at which the sole construction has not already been made water-tight by other measures.

The insole of the footwear according to the invention can consist of viscose, nonwoven, for example, polyester nonwoven, to which melt fibers can be added, leather or glued leather fibers. An insole is available under the name Texon Insole from Texon Mockmuhl GmbH in Mockmuhl, Germany. Insoles from such materials are water-permeable. An insole from such a material or other materials can be made water-tight by arranging a layer of water-tight material on its surface or in its interior. For this purpose, a film with cap material V25 from Rhenoflex in Ludwigshafen, Germany can be ironed on. If the insole is not only to be water-tight, but also water vapor-permeable, it is provided with a water-tight, water vapor-permeable functional layer, which is preferably constructed with ePTFE (expanded microporous polytetrafluoroethylene). A leather insole equipped in this way is available under the tradename TOP DRY from W. L. Gore & Associates GmbH, Putzbrunn, Germany.

Gluing of the reactive adhesive to the shoe bottom is particularly intimate, if the reactive adhesive is mechanically forced against the shoe bottom after application to the shoe bottom. A pressing device is preferably suitable for this purpose in the form of a pressure cushion, with a smooth material surface not wettable by the reactive hot-melt adhesive and therefore not adherent to the reactive hot-melt adhesive, for example, made of nonporous polytetrafluoroethylene (also known under the tradename Teflon). A pressure cushion is

preferably used for this purpose in the form of a rubber cushion or air cushion, whose pressing surface is coated with a film of the mentioned material, for example, nonporous polytetrafluoroethylene, or such a film is arranged before the pressing process between the sole construction provided with the reactive hot-melt adhesive and the pressure cushion.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention will now be further explained, with reference to variants. In the drawings:

Fig. 1 schematically depicts a bottom view of a first variant of a shoe according to the invention without outsole;

Fig. 2 schematically depicts a side view of the sole region of the shoe depicted in Fig. 1;

Fig. 3 schematically depicts a bottom view of a second variant of a shoe according to the invention without outsole;

Fig. 4 schematically depicts a side view of the sole region of the shoe depicted in Fig. 1; and

Fig. 5 schematically depicts the side view, as in Fig. 2, but with additional schematic representation of a pressing device for pressing of reactive hot-melt adhesive.

Fig. 6 schematically depicts, in a cross sectional view, a third variant of a shoe according to the invention with insole, vertical shank end region and a roughly vertical mesh strip;

Fig. 7 schematically depicts, in a cross section, a fourth variant of a shoe according to the invention with insole, vertical upper material end region, horizontal functional layer end region and roughly horizontal mesh strip;

Fig. 8 schematically depicts a cross section of a fifth variant of a shoe according to the invention with insole, horizontal shank end region and roughly horizontal mesh strip;

Fig. 9 schematically depicts a perspective section of the fifth variant, still without outsole;

Fig. 10 schematically depicts a view, as in Fig. 9, but with outsole;

Fig. 11 schematically depicts a partially cutaway perspective view of an entire shoe according to the fifth variant;

Fig. 12 schematically depicts a sixth variant of a shoe according to the invention with a design as in the third variant, but without mesh strip;

Fig. 13 schematically depicts a seventh variant of a shoe according to the invention, which agrees with the sixth variant, but additionally has fixation gluing between the upper material end region and the functional layer;

Fig. 14 schematically depicts an eighth variant of a shoe according to the invention with the design as in the fourth variant, but without mesh strip;

Fig. 15 schematically depicts a ninth variant of a shoe according to the invention, which agrees with the eighth variant, but additionally has a fixation gluing between the upper material end region and the functional layer;

Fig. 16 schematically depicts a tenth variant of a shoe according to the invention with the design as in the fifth variant, but without mesh strip;

Fig. 17 schematically depicts an eleventh variant of a shoe according to the invention, which agrees with the tenth variant, but additionally has a fixation gluing between the upper material end region and the functional layer;

Fig. 18 schematically depicts a twelfth variant of a shoe according to the invention without insole, in which the functional layer end region is stretched in horizontal alignment with string lasting with a mesh strip;

Fig. 19 schematically depicts a thirteenth variant of a shoe according to the invention with a design as in the twelfth variant, but without mesh strip and with a second string lasting;

Fig. 20 schematically depicts the fourth variant of the invention, but still without outsole, with a pressing device for pressing of the previously applied reactive hot-melt adhesive; and

Fig. 21 schematically depicts a strongly enlarged, not-to-scale, two-dimensional view of a section of a sole construction with reactive hot-melt adhesive cured by three-dimensional crosslinking of molecular chains.

DETAILED DESCRIPTION OF PREFERRED VARIANTS OF THE INVENTION

The shoe of the first variant of the invention, depicted in Fig. 1, has an insole 1, a shank with a last insert 2 connected to the insole 1 by glue lasting, and reactive hot-melt adhesive 3 applied to the bottom of insole 1 and last insert 2. The reactive hot-melt adhesive 3 then covers the entire region of the insole bottom not covered by the last insert 2 and a partial region of the last insert 2 adjacent to this region of insole 1. In a preferred variant, overlapping 3a of the reactive hot-melt adhesive 3 over last insert 2 exists in a width of about 1 cm.

Such a shoe is preferably produced as follows:
The insole 1 is initially fastened to the bottom of a last (not shown). A shank is then stretched over the last, the peripheral edge of the insole bottom is provided with the ordinary last adhesive and the last insert 2 is pulled onto the insole bottom and glued to it. The reactive hot-melt adhesive 3 is then applied to the bottom of insole 1 and last insert 2 and pressed there, in order to obtain a shoe bottom with a flat and uniform surface.

This manufacturing state is shown in a side view in Fig. 2.

An outsole (not shown) is then applied to the shoe bottom provided with the reactive hot-melt adhesive 3, for example, by gluing.

The shoe bottom or sole construction is made water-tight with the reactive hot-melt adhesive 3.

The second variant of the invention, depicted in Fig. 3, shows a shoe that agrees with the shoe depicted in Figures 1 and 2, with the exception that it is provided on the lower surface facing away from insole 1 with an open-pore glue-compatible material 4, which is glued flush in the reactive hot-melt adhesive 3. By application of this material 4, the waiting times are reduced and immediate further processing of the shoe produced thus far is made possible.

A side view of this shoe of the second variant corresponding to Fig. 2 is shown in Fig. 4, in which the flush gluing of material 4 with reactive hot-melt adhesive 3 is readily apparent.

The reactive hot-melt adhesive 3 is preferably applied as a viscous adhesive, in which the degree of fluidity can be influenced by the intensity of heating of the reactive hot-melt adhesive 3.

A pressing device 5 for pressing the reactive hot-melt adhesive 3 onto the bottoms of the insole 1 and last insert 2 is shown very schematically in Fig. 5. A pressure cushion of the already mentioned type is particularly suited for this purpose.

The terms vertical and horizontal will be used below to describe the position of individual shoe components. This refers to the depictions in the figures and corresponds to the idea that shoes, in most cases, are situated with their outsole on a horizontal floor or some other type of horizontal substrate.

Fig. 5 shows a third variant of a shoe according to the invention in a highly schematized cross sectional view, with a shank 11, which is constructed with an upper material 13 and a functional layer 15 covering its inside. The functional layer 15 can be part of a functional layer laminate that has the functional layer and a liner layer on its inside. The functional layer 15 can also be provided on its outside facing upper material 13 with a textile backing (not shown). There are also variants, in which the functional layer and the lining are separate material layers.

Fig. 6 also shows an insole 17 and a shell-like prefrabricated outsole 19, which is constructed with rubber and/or plastic. The upper material 13 and the functional layer 15 have a vertically ending upper material end region 21 and functional layer end region 23, i.e., perpendicular to the

tread surface of outsole 19. The functional layer end region 23 has a projection 25 relative to the upper material end region 21. The projection 25 is bridged by means of a mesh strip 27. A first upper long side of the mesh strip is stitched to the lower end of the upper material end region 21 by means of a first seam 29. A lower, second long side of mesh strip 27 is also stitched to both insole 17 and to the lower end of functional layer end region 23 by means of a Strobel seam.

A reactive hot-melt adhesive 33 that leads to water-tightness in the cured state is applied to the outside of mesh strip 27. In the liquid state, which the reactive hot-melt adhesive reaches, for example, by heating, the reactive hot-melt adhesive 33 penetrates the mesh strip 27 and enters the region of projection 25 on the outside of functional layer 15. In the cured state, the reactive hot-melt adhesive 33 then seals this region of the functional layer 15 water-tight. The reactive hot-melt adhesive 33 is preferably applied in such an extent and amount that it also seals the cutting edge of functional layer 15 on the lower end of functional layer end region 23. The peripheral region of insole 17, adjacent to the functional layer end region 23, and the fastening seams, in which the functional layer 15 participates, are preferably also sealed.

Water or other liquid that has penetrated along the water- or liquid-conducting upper material 13 to the lower end of upper material end region 23 cannot reach the inside of functional layer 15 and therefore cannot reach the inside lining of the shoe, because of this sealing by means of reactive hot-melt adhesive 33.

Outsole adhesive 35 is preferably applied to the entire inside of outsole 19, in which an ordinary outsole adhesive can be involved, in the form of a solvent adhesive or hot adhesive. Outsole adhesive 37 is also applied to the outside of upper material 13. A manufacturing state of the shoe of the first variant is shown in Fig. 1 before the outsole 19 is pressed upward against the insole 17, in order to glue it to insole 17 and to the shank end region on the sole side. The outsole adhesive 35 reaches the inside of shell edge 40 of outsole 19 in glue connection with the outsole adhesive 37 applied to the shank end region.

For better depiction and clarity, the spacings between the individual components of the shoe construction are shown larger than they are in reality in Fig. 6 and the subsequent figures. The

spacings between the individual components are actually dimensioned so that, after pressing of outsole 19 onto insole 17, the shell edge 40 lies tightly against the outside of upper material 13 and is glued to the upper material 13.

Fig. 7 shows a fourth variant of a shoe according to the invention, which largely agrees with the first variant, depicted in Fig. 6, but deviates from the first variant to the extent that, in the second variant, only the upper material end region 21 ends vertically, but the functional layer end region 23 ends horizontally, i.e., parallel to the tread surface of outsole 19. The projection 25 of the functional layer end region 23, and essentially also the mesh strip 27 and reactive hot-melt adhesive 33, therefore run horizontally. Owing to the horizontal extent of functional layer end region 23, the insole 17 does not extend over the entire sole width of the shoe construction, but its peripheral edge has a spacing from the vertical part of shank 11. Otherwise, agreement exists with the first variant, so that, in terms of additional aspects of the second variant, the above comments concerning the first variant are referred to.

Fig. 8 shows a fifth variant of a shoe according to the invention, in which both the upper material end region 21 and the functional layer end region 23 run horizontally, which, in this variant, leads to a roughly horizontal extent of the mesh strip 27 and the reactive hot-melt adhesive 33. Such a shoe design permits the use of a plate-like outsole 39, since, unlike the first and second variants, no inclusion of a vertical end region of shank 19 by means of a shell edge of a shell-like outsole is required. For this reason, any outsole can be used for the third variant, for example, a leather sole, as is desired for shoes of the elegant type. Owing to the exclusively horizontal trend of outsole 39, the outsole adhesive 33 applied to the outside of upper material 13 is applied to the horizontally running upper material end region 21.

The fifth variant, depicted in Fig. 8, is shown in Fig. 9 in a partially cutaway perspective view, but still without outsole. This figure shows a last 41, over which the shank 11 is pulled. Deviating from Fig. 8, a separate liner layer 43 is shown in Fig. 9 on the inside of functional layer 15. Fig. 4 shows the shoe design in a state in which the reactive hot-melt adhesive has only been applied to the bottom of mesh strip 27, but still not forced to penetrate up to the functional layer end region 23 through mesh strip 27.

Fig. 10 shows a shoe design according to Fig. 9, also in a partially cutaway perspective view, after gluing of an outsole 39 onto the bottom of insole 17 and onto the bottom of the vertical region of shank 11. The last 41 has already been removed from the shoe in this depiction.

For better explanation, a circular cutout of the sole construction is additionally shown in magnification. It can be gathered from this that, in this stage of manufacture, the reactive hot-melt adhesive 33 has already penetrated up to the functional layer 15.

Fig. 11 shows, in a perspective view, an entire shoe of the fifth variant, shown in Fig. 10, in which one part of the shoe is cut off to show at which site of the shoe the cut according to Fig. 10 is situated.

Fig. 12 shows a sixth variant of the shoe according to the invention, which agrees with the third variant, depicted in Fig. 6, with the exception that, in the sixth variant, no mesh strip 27 is present. The preceding description concerning the third variant can therefore largely be referred to.

In the sixth variant, no connection between the lower end of upper material end region 21 and the lower end of functional layer end region 23 and insole 17 exists before gluing of outsole 19 and before gluing to the reactive hot-melt adhesive 33 in the shank end region. Only after application of reactive hot-melt adhesive 33 is there a connection, because of its gluing effect, between the upper material end region 21 and the functional layer end region 23, if the reactive hot-melt adhesive is applied to an extent that includes the lower edge of the upper material end region, which is not absolutely necessary. After gluing of outsole 19 to insole 17 and shank 11, the upper material end region 21 is also laterally fixed by means of the shell edge 40 of outsole 19.

The seventh variant, depicted in Fig. 13, agrees with the sixth variant, shown in Fig. 13, with the only exception that the upper material end region 21 is fixed by means of fixation glue 43 on the outside of functional layer 15. This serves for easier handling of the shank 11 during the manufacturing steps before gluing-on of outsole 19.

The eighth variant of the invention, shown in Fig. 14, shows a shoe construction that agrees with the fourth variant according to Fig. 7, with the exception that no mesh strip is present. With respect to the agreements with the fourth variant, the explanations concerning Fig. 7 can be referred to. As in the case of the sixth variant, depicted in Fig. 12, the reactive hot-melt adhesive 33 in the eighth variant is also applied directly to the outside of the projection 25 of functional layer end region 23, which leads to a particularly good, sealing gluing of functional layer end region 23 by the reactive hot-melt adhesive 33.

Corresponding to the sixth variant in Fig. 12, in the sixth variant in Fig. 14, no fixation gluing is prescribed between the upper material end region 21 and the outside of functional layer 15. The upper material end region 21 therefore lies only loosely on the outside of functional layer 15 before gluing with reactive hot-melt adhesive 33 and before gluing-on of outsole 19.

Fig. 15 shows a ninth variant, which represents a modification relative to the eighth variant, shown in Fig. 14, when the upper material end region 21 is fixed by means of fixation glue 43 onto the outside of the lower end of the vertical region of functional layer 15 before the additional manufacturing steps are conducted, namely, stitching of the functional layer end region 23 to insole 17, application of reactive hot-melt adhesive 33 and gluing-on of outsole 19. Otherwise, the previous explanations concerning the previous figures can be referred to with respect to the seventh variant.

The tenth variant of the invention, depicted in Fig. 16, agrees with the fifth variant, depicted in Fig. 8, with the exception that no mesh strip is present. The previous explanations concerning Fig. 8 can therefore largely be referred to. In the tenth variant, the reactive hot-melt adhesive 33 is also applied directly to the outside of the projection 25 of functional layer end region 23, possibly with an extent so that even the end of the horizontal upper material end region 21, the peripheral edge of insole 19 and the Strobel seam 31 are included in sealing by the reactive hot-melt adhesive 33. In this variant, there is no fixation gluing between the functional layer 15 and the upper material end region 21.

The eleventh variant, depicted in Fig. 17, agrees with the tenth variant, depicted in Fig. 16, with the exception that the upper material end region 21 is fixed by means of a fixation glue 43 to the outside of functional layer end region 23.

Fig. 18 shows, as a twelfth variant of the invention, a shoe without insole or without insole in the depicted region of the shoe. There are shoes that are constructed over part of their shoe length, for example, in the front foot region, without an insole and, in the rest of the shoe, with an insole.

Since the shoe or shoe part depicted in Fig. 18 has no insole, the components of the vertical shank region, namely, the horizontal upper material end region 21 and the horizontal functional layer end region 23, must be secured in some other way in their horizontal position. For this purpose, a string lasting 45 is used, by means of which the functional layer end region 23 is lashed together. The string lasting 45 has a loop-like string tunnel 49, which runs around the entire inner periphery of the functional layer end region 23, in which a string 51 is situated, by means of which the functional layer end region 21 can be lashed together, while the shank is stretched over a last (not shown in Fig. 18).

In this variant, a mesh strip 27 is stitched on a long side to the upper material end region 21 and on the other long side to the string tunnel 49 of string lasting 45, so that the projection 25 of the functional layer end region 23 is bridged by the mesh strip 27 and the upper material region 21 kept horizontal. Reactive hot-melt adhesive 33 is applied to the bottom of mesh strip 27, which leads in the reacted state to a water-tight sealing of functional layer 15 in the region of functional layer end region 23. The reactive hot-melt adhesive 33 is dimensioned, if possible, so that it includes in its sealing the string lasting 45 and/or the seam 29 between the mesh strip 27 and the upper material end region 31.

After application of reactive hot-melt adhesive 33, a plate-like outsole 39 is glued onto the bottom of the horizontal shank region by means of outsole glue 37. Although not shown in Fig. 18, outsole glue can also be applied in this variant to the bottom of upper material end region 21 before the outsole 39 is glued-on.

Fig. 19 shows a thirteenth variant, which agrees with the twelfth variant, depicted in Fig. 18, with the exception that it has no mesh strip, but, for this purpose, a second string lasting 47, by means of which the upper material end region 21 is lashed together in the horizontal position. In this variant, the reactive hot-melt adhesive 33 is applied directly to the outside of projection 25 of the functional layer end region 21.

The second string lasting 47 has a loop-like string tunnel 49, which runs around the entire inner periphery of the upper material end region 21, and in which a string 51 is situated, by means of which the upper material end region 21 can be lashed together, while the shank is stretched over a last (not shown in Fig. 18).

The reactive hot-melt adhesive 33 is then proportioned, if possible, so that it includes in its sealing the string lastings 45 and 47.

A manufacturing aid is shown in Fig. 20 in a very schematized view, namely, a pressing device 53, by means of which the reactive hot-melt adhesive 33 can be pressed in the liquid state against the outside of the functional layer end region 21. This is shown in Fig. 21 for a shoe design according to the fourth variant, depicted in Fig. 7, but can also be used for all of the other described variants.

After the reactive hot-melt adhesive 33 has been applied and optionally brought to the liquid state by activation, it is pressed by means of pressing device 53 in the direction toward functional layer end region 23, in order to ensure particularly intimate gluing of the reactive hot-melt adhesive 33 to the outside of functional layer 15 in the functional layer end region 23, which is preferred, in particular, in shoe variants with a mesh strip, in order to ensure that sufficient reactive hot-melt adhesive 33 penetrates to the surface of functional layer 15.

The pressing device 53 can have a flat shell shape of the form depicted in Fig. 20 or a form other than that depicted in Fig. 20, which can depend on the shape of the corresponding shoe design. The pressing device 53 can also be designed as a pressure cushion, for example, in the form of a rubber cushion or air cushion, i.e., a cushion filled with air. At least the surface of the pressing

device 53, which comes in contact with the reactive hot-melt adhesive 33 during the pressing process, is made of a material that is not wettable by the reactive hot-melt adhesive 33, i.e., is not glued to it. A pressing device 53 with a surface made of polytetrafluoroethylene (also known under the tradename Teflon) is particularly suited, which has a smooth surface and not a porous surface, as for the expanded microporous tetrafluoroethylene suitable for the functional layer. The surface of the pressing device 53 itself consists of such a material, or a film of such material is introduced before the pressing process between the sole construction of the footwear and the pressing device 53.

Fig. 21 shows a section of a sole construction with reactive hot-melt adhesive 33 reacted by three-dimensional crosslinking of the molecular chains in a schematized, not-to-scale, strongly enlarged two-dimensional depiction (in which the seam 31 connecting the functional layer end region 23 and the insole 17 is not shown). The three-dimensionality of crosslinking develops, owing to the fact that the molecular chains of the reactive hot-melt adhesive 33 also crosslink in the third dimension, not visible in Fig. 22 (perpendicular to the surface of the drawing), in the manner shown for the two dimensions. The three-dimensional crosslinking leads to a particularly strong protection against penetration of water into the adhesive.

CLAIMS

1. Footwear with a shank (11) and with a sole construction having an outsole (19, 39), in which
the shank (11) is constructed with an upper material (13) and with a water-tight functional layer (15) at least partially covering the upper material (13) on its inside and a shank end region on the sole side with an upper material end region (21) and a functional layer end region (23),
the outsole (19) is connected to the shank end region, the functional layer end region (23) has a projection (25) and a glue zone from a reactive hot-melt adhesive (33) that leads to water-tightness in the cured state, closed in the outsole peripheral direction, is applied to projection (25).

2. Footwear according to Claim 1, in which the outsole (19, 39) is glued to the shank end region by means of outsole glue (35) applied to it.

3. Footwear according to Claim 1 or 2, in which the reactive hot-melt adhesive (33) extends over the entire projection width.

4. Footwear according to one of the Claims 1 – 3, in which the shank end region extends essentially perpendicular to the tread surface of the outsole (19, 39), and the functional layer end region (23) protrudes in the direction toward the tread surface over the upper material end region (21).

5. Footwear according to one of the Claims 1 – 3, in which the shank end region extends essentially parallel to the tread surface of outsole (19, 39), and the functional layer end region (23) protrudes above the upper material end region (21) in the direction toward the center of the outsole.

6. Footwear according to one of the Claims 1 to 5, with an insole (17), to which the functional layer end region (23) is attached.

7. Footwear according to Claim 6, in which the functional layer end region (23) is joined to the insole (17) by means of a seam (31).

8. Footwear according to Claim 5, in which the functional layer end region (23) is held essentially parallel to the tread surface of outsole (19, 39) by means of a string lasting (45).

9. Footwear according to one of the Claims 1 – 8, in which the upper material end region (21) is fastened to the functional layer (23) by means of fixation glue (43).

10. Footwear according to one of the Claims 1 – 9, in which the projection (24) is bridged by a connection strip made of a material permeable to the liquid reactive hot-melt adhesive (33), and the reactive hot-melt adhesive (33) is applied to the outside of the connecting strip.

11. Footwear according to Claim 10, in which the connecting strip is constructed with a mesh strip (27).

12. Footwear according to Claim 11, in which a first long side of the mesh strip (27) is fastened to the upper material end region (21).

13. Footwear according to Claim 12, in which the first long side of the mesh strip (27) is stitched to the upper material end region (21).

14. Footwear according to one of the Claims 11 to 13, in which a second long side of the mesh strip (27) is fastened to the functional layer end region (23).

15. Footwear according to Claim 14, in which the second long side of the mesh strip (27) is stitched to the functional layer end region (23).

16. Footwear according to one of the Claims 12 – 15, in which the second long side of the mesh strip (27) is fastened to the end sole (17).

17. Footwear according to Claim 16, in which the second long side of the mesh strip (27) is stitched to the insole (17).

18. Footwear according to one of the Claims 12 – 15, in which the second long side of the mesh strip (27) is fastened to the string lasting (45) holding the functional layer end region (23).

19. Footwear according to Claim 18, in which the second long side of the mesh strip (27) is stitched to the string lasting (45) holding the functional layer end region (23).

20. Footwear according to one of the Claims 8 – 14 and 17 – 19, in which the upper material end region (21) is held parallel to the tread surface of the outsole (19, 39) by means of a second string lasting (47).

21. Footwear according to one of the Claims 1 – 20, in which the functional layer (15) is constructed with a water-tight and water vapor-permeable functional layer.

22. Footwear according to Claim 21, with a functional layer (15) constructed with expanded microporous polytetrafluoroethylene.

23. Footwear according to one of the Claims 1 – 22, in which the outsole (19) has an essentially shell shape with a plate-like tread surface region and a shell edge (40) protruding essentially perpendicular from it.

24. Footwear according to one of the Claims 5 – 22, in which the outsole (39) has essentially a plate shape.

25. Method for production of footwear with the following manufacturing steps:

a shank (11) is created, which is constructed with an upper material (13) and with a water-tight functional layer (15) that at least partially covers the upper material (13) on its inside and is provided with a shank end region on the sole side;
the upper material (13) is provided with an upper material end region (21) on the sole side, and the functional layer (15) is provided with a functional layer end region (23) on the sole side,
in which the functional layer end region (23) is provided with a projection (25) that extends above the upper material end region (21);
a glue zone from a reactive hot-melt adhesive (33) that leads to water-tightness in the cured state and closed in the sole peripheral direction is applied to the projection (25);
an outsole (19, 39) is attached to the shank end region.

26. Method according to Claim 25, in which the projection (25) is bridged by a connecting strip made of a material permeable to the liquid reactive hot-melt adhesive (33), and the reactive hot-melt adhesive (33) is applied to an outside of the mesh strip (27).

27. Method according to Claim 26, in which a connecting strip is applied with a mesh strip (27).

28. Method according to Claim 27, in which a first long side of mesh strip (27) is stitched to the upper material end region (21) and a second long side of mesh strip (27) is stitched to the functional layer end region (23).

29. Method according to one of the Claims 28 – 28, in which the sole construction is provided with an insole (17).

30. Method according to one of the Claims 26 – 29, in which the second long side of the mesh strip (27) is stitched to the insole (17).

31. Method according to one of the Claims 25 – 28, in which the functional layer end region (23) is stretched by means of a string lasting (45) essentially parallel to the tread surface of outsole (19, 39).

32. Method according to Claim 31, in which, during production of footwear with a mesh strip (27), the second long side of the mesh strip (27) is stitched to the string lasting (45).

33. Method according to Claim 31 or 32, in which the upper material end region (21) is stretched by means of a second string lasting (47) essentially parallel to the tread surface of outsole (19, 39).

34. Method according to one of the Claims 25 – 33, in which the reactive hot-melt adhesive (33), after application on projection (25) and mesh strip (27), is pressed with a pressing device (53), with a pressing surface that does not adhere to the reactive hot-melt adhesive (33), on the surface of the projection (25) and the mesh strip (27).

35. Method according to one of the Claims 25 – 34, in which a reactive hot-melt adhesive (33), curable by means of moisture, is used, which is applied to the region being sealed and exposed to moisture for curing.

36. Method according to Claim 35, in which a thermally activatable reactive hot-melt adhesive (33), curable with moisture, is used, which is thermally activated, applied to the region being sealed and exposed to moisture for curing.

37. Method according to one of the Claims 25 – 36, in which a water-tight and water vapor-permeable functional layer (15) is used.

38. Method according to Claim 37 in which a functional layer (15) constructed with expanded microporous polytetrafluoroethylene is used.

39. Sealed shoe with a shank and insole (1), to which the shank is connected, in which reactive hot-melt adhesive (3) based on polyurethane is applied over the surface and pressed on the shoe bottom in the region of insole (1) and the shank part connected to it.

40. Shoe according to Claim 39, in which an open-pore, glue-compatible material (4) is applied over the entire shoe and the side region.

41. Shoe according to Claim 39, in which an open-pore, glue-compatible material (4) is applied over a part of the shoe and the side region.

42. Shoe according to one of the Claims 39 to 41, in which the surface of the open-pore, glue-compatible material (4) is glued flush in the reactive hot-melt adhesive (3).

43. Shoe according to one of the Claims 39 to 42, in which the shoe bottom to be further processed has a flat and uniform surface.

44. Shoe according to one of the Claims 39 to 43, in which the shank is joined to the insole (1) by glue lasting.

45. Shoe according to Claim 44, in which the reactive hot-melt adhesive (3) is applied on a width of about 1 cm overlapping between the insole (1) and lasted shank.

46. Method for production of a shoe with a shank and an insole (1), in which the shank is joined to the insole (1), and reactive hot-melt adhesive (3) based on polyurethane is applied over the surface and pressed on the shoe bottom in the region of insole (1) and the shank part connected to it.

47. Method according to Claim 46, in which an open-pore, glue-compatible material (4) is applied over the entire shoe and the side region.

48. Method according to Claim 47, in which an open-pore, glue-compatible material (4) is applied over a part of the shoe and the side region.

49. Method according to one of the Claims 46 to 48, in which the surface of the open-pore, glue-compatible material (4) is glued flush in the reactive hot-melt adhesive (3).

50. Shoe according to one of the Claims 46 to 49, in which the shoe bottom to be further processed is provided with a flat and uniform surface.

51. Method according to one of the Claims 46 to 50, in which the shank is joined to the insole (1) by glue lasting.

52. Method according to Claim 51, in which the reactive hot-melt adhesive (3) is applied on a width of about 1 cm overlapping between the insole (1) and the lasted shank.

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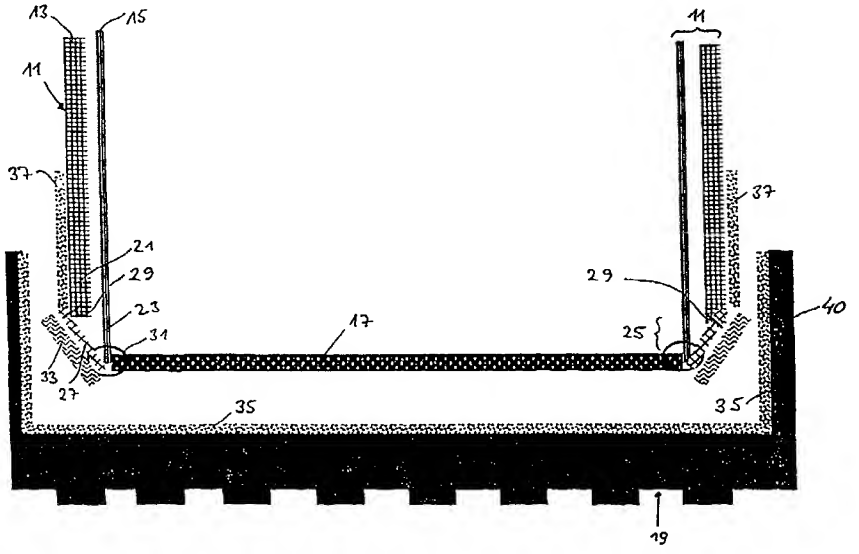
Veröffentlicht
Mit internationalem Recherchenbericht.

(54) Title: FOOTWEAR HAVING A SEALED SOLE CONSTRUCTION AND A METHOD FOR THE PRODUCTION THEREOF

(54) Bezeichnung: SCHUHWERK MIT ABGEDICHTETEM SOHLENAUFBAU UND VERFAHREN ZU DESSEN HERSTELLUNG

(57) Abstract

The invention relates to footwear comprising a shank (11) and a sole construction having an outsole (19). The shank (11) is constructed with an upper material (12) and with a water–tight functional layer (15) which at least partially lines the upper material (13) on the inner side thereof. In addition, the shank comprises, on the side of the sole, a shank end area having an upper material end area (21) and a functional layer end area (23). The outsole (19) is connected to the shank end area. The functional layer end area (23) has a projection (25) which projects above the upper material end area. An adhesive zone which seals in a peripheral direction of the outsole and which consists of a reactive hot–melt adhesive (33) is applied to the projection (25). Said hot–melt adhesive leads to water impermeability after having been completely reacted.



(57) Zusammenfassung

Schuhwerk mit einem Schaft (11) und mit einem eine Laufsohle (19) aufweisenden Sohlenaufbau, wobei der Schaft (11) mit einem Obermaterial (13) und mit einer das Obermaterial (13) auf dessen Innenseite mindestens teilweise auskleidenden, wasserdichten Funktionsschicht (15) aufgebaut ist und einen sohlenseitigen Schaftendbereich mit einem Obermaterialendbereich (21) und einen Funktionsschichtendbereich (23) aufweist, die Laufsohle (19) mit dem Schaftendbereich verbunden ist, der Funktionsschichtendbereich (23) einen über den Obermaterialendbereich hinausreichenden Überstand (25) aufweist und auf den Überstand (25) eine in Laufsohlenumfangsrichtung geschlossene Klebstoffzone aus einem Reaktiv–Schmelzklebstoff (33), der im ausreagierten Zustand zu Wasserdichtigkeit führt, aufgebracht ist.

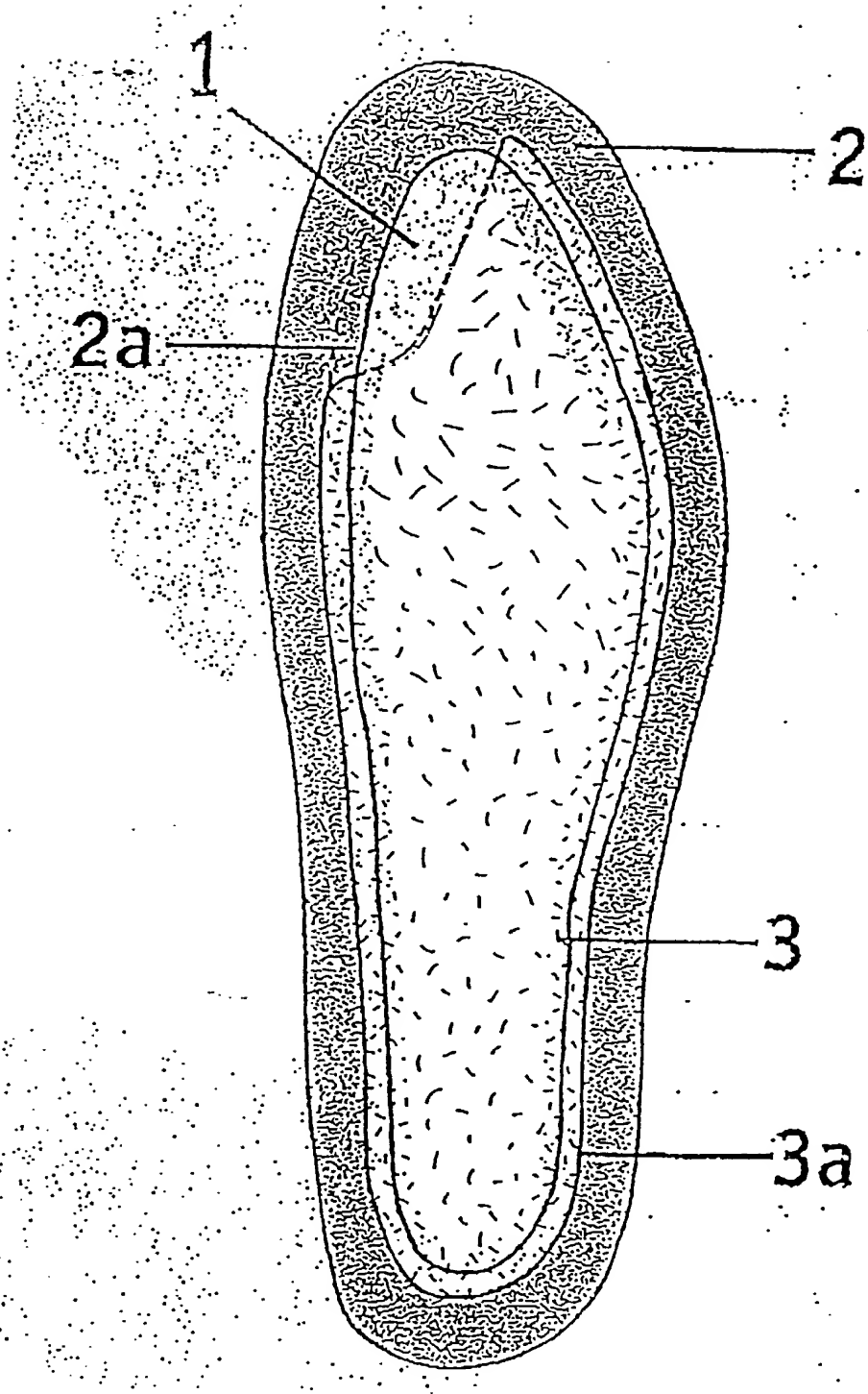


FIG 1

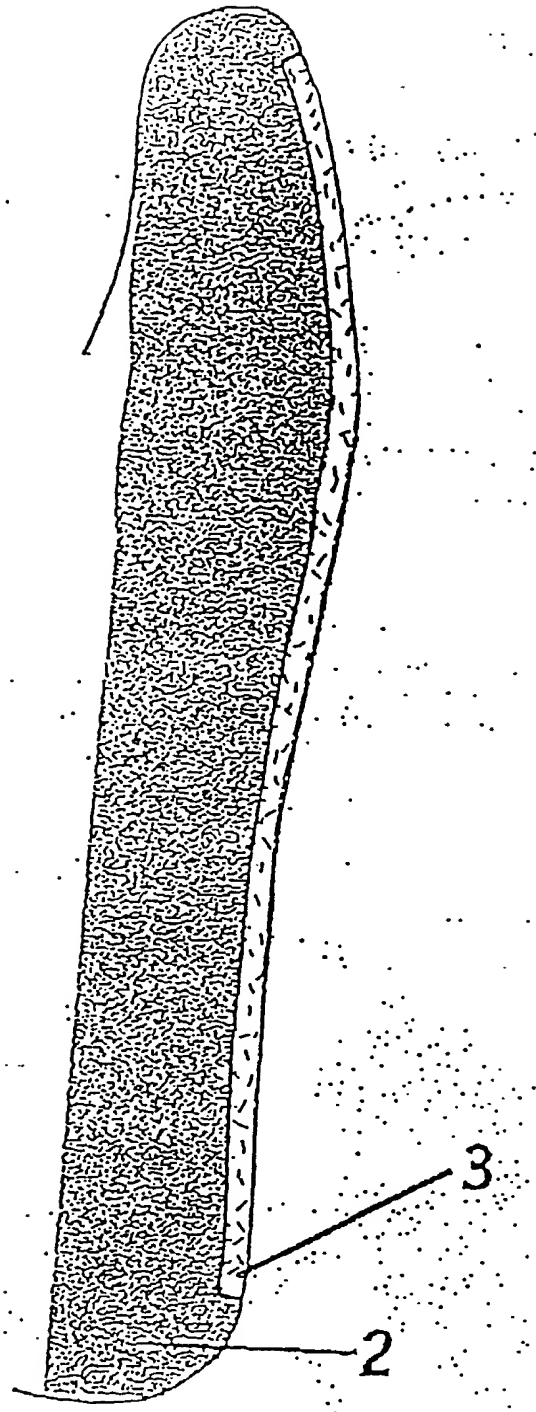


FIG. 2

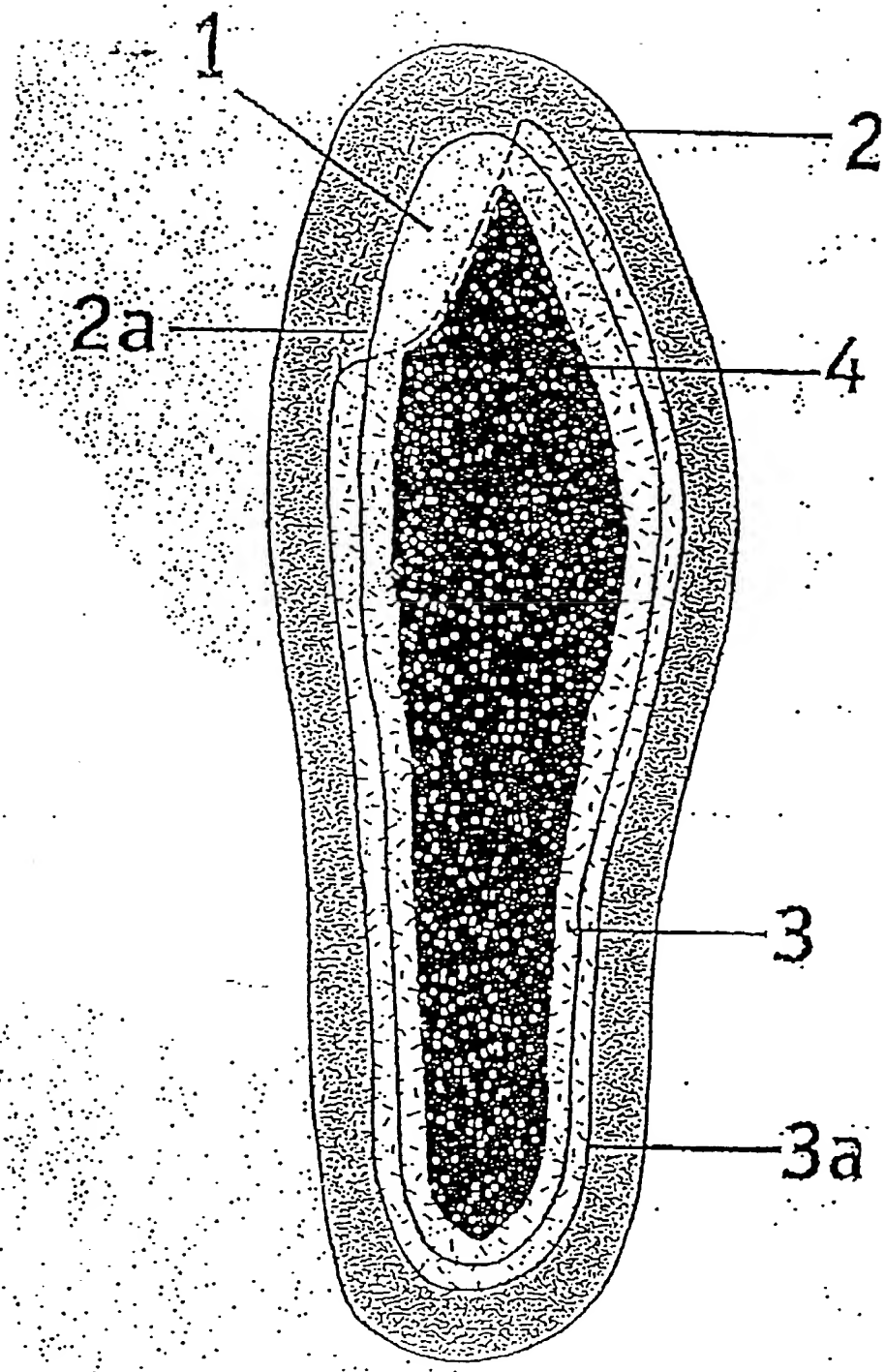


FIG. 3

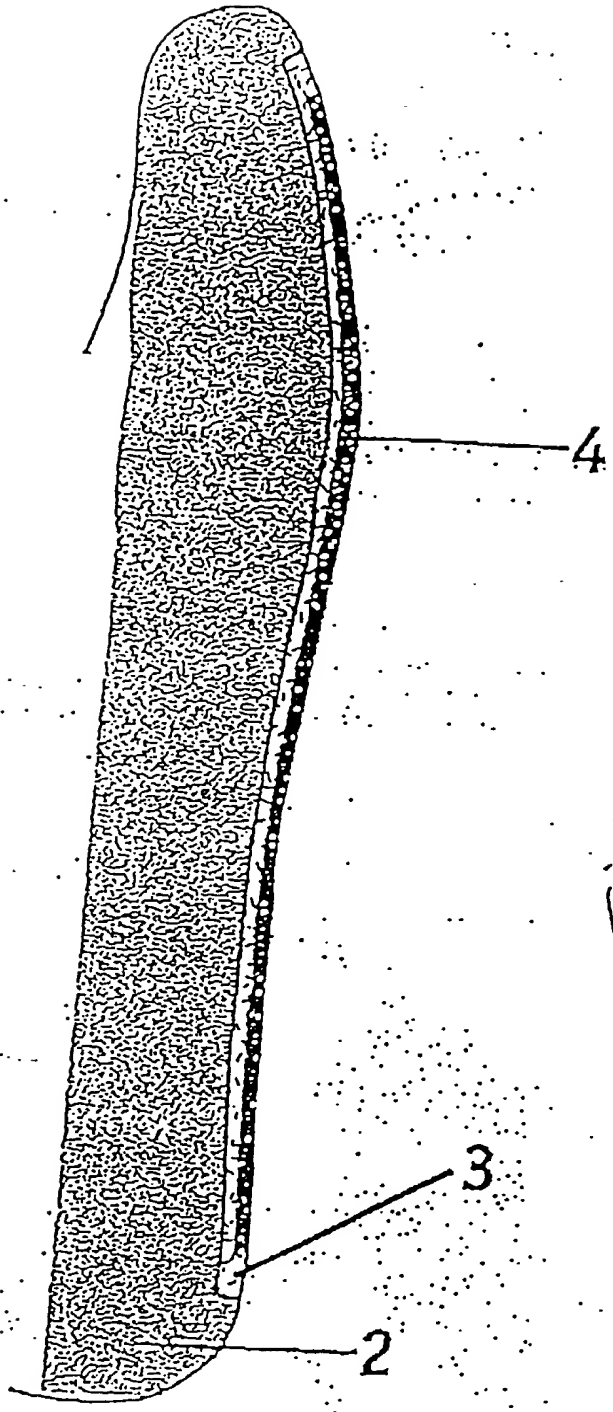


Fig. 4

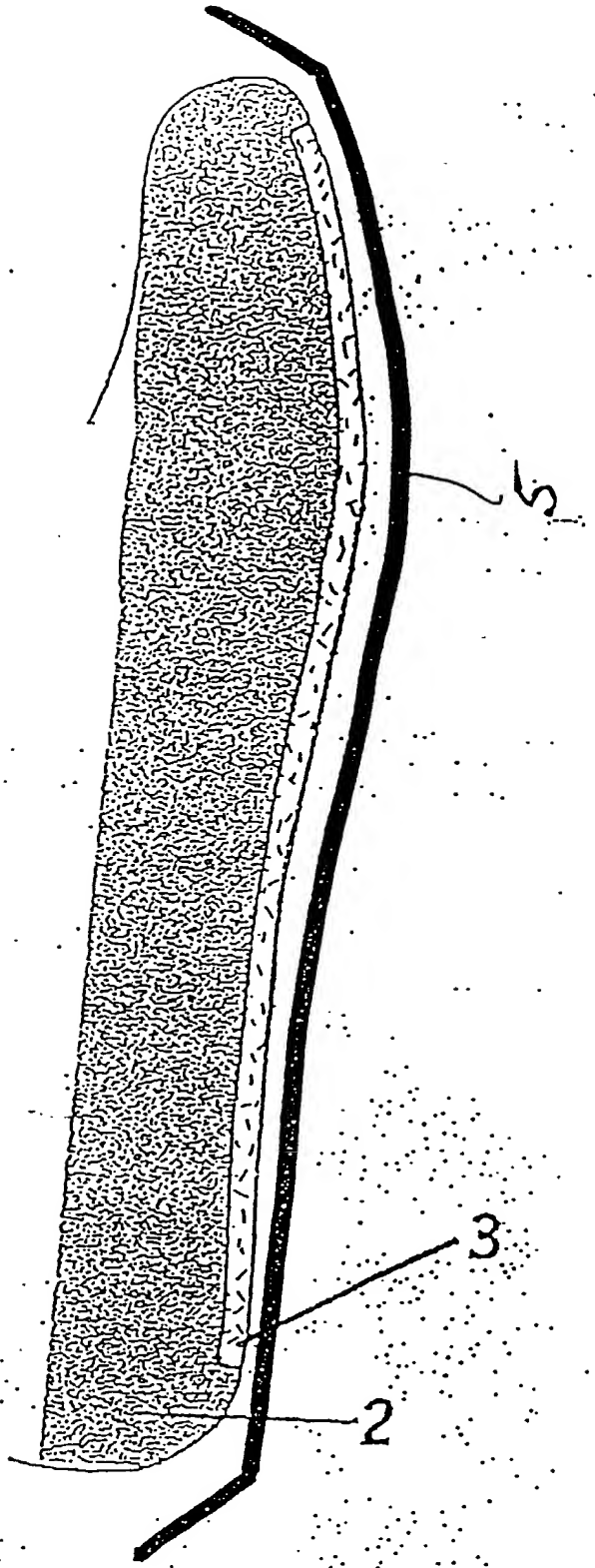


FIG. 5

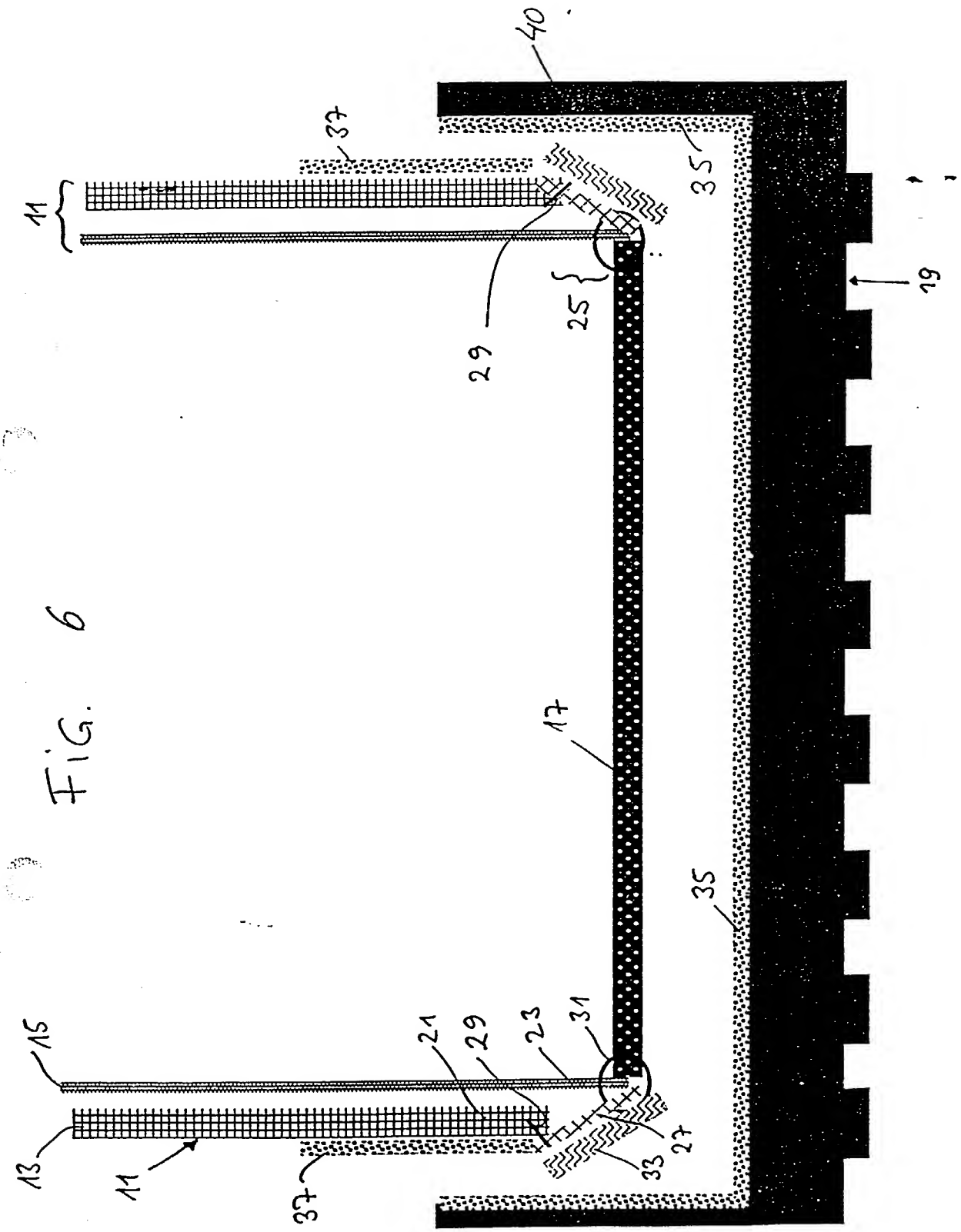


FIG. 6

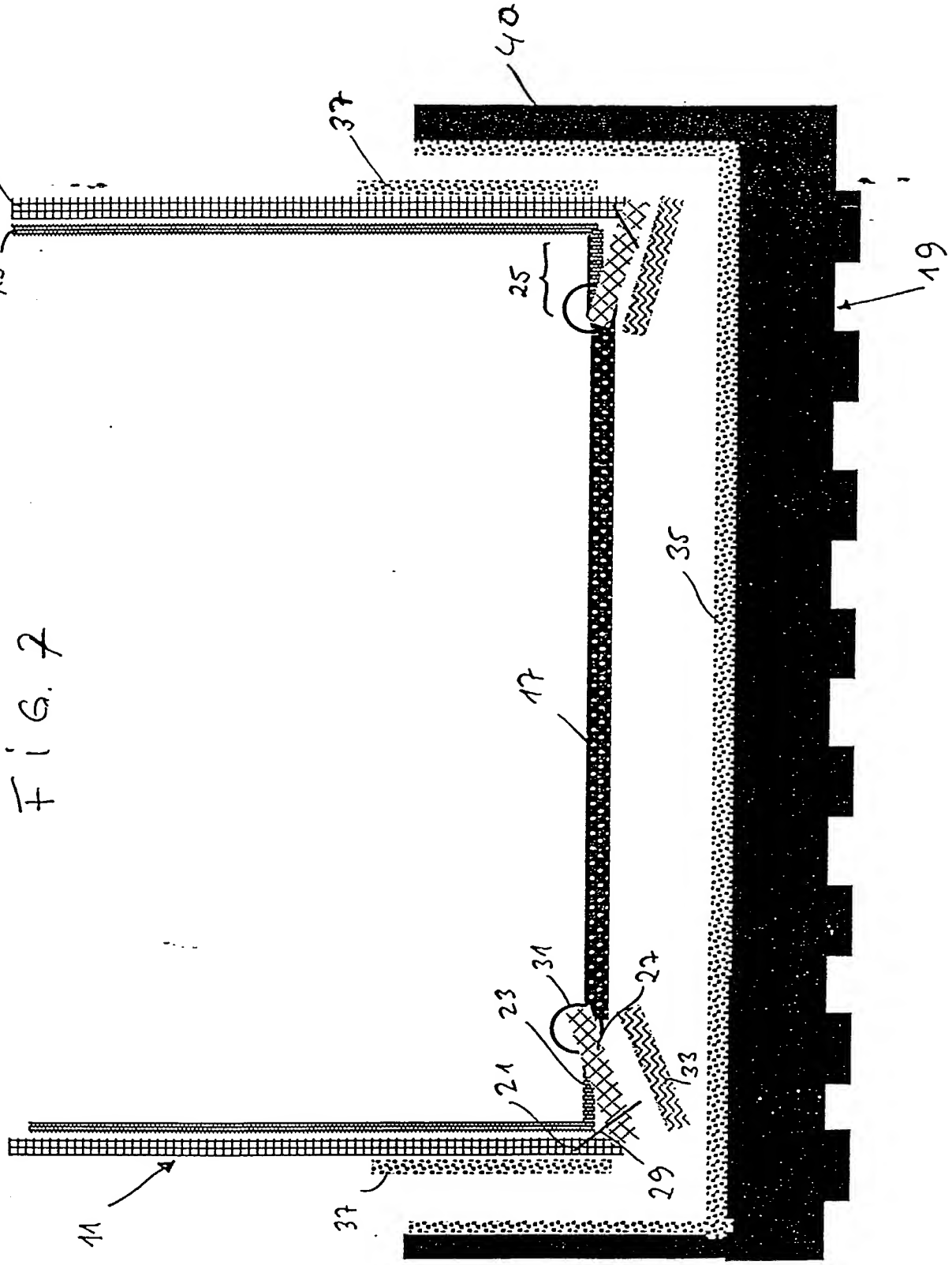


Fig. 2

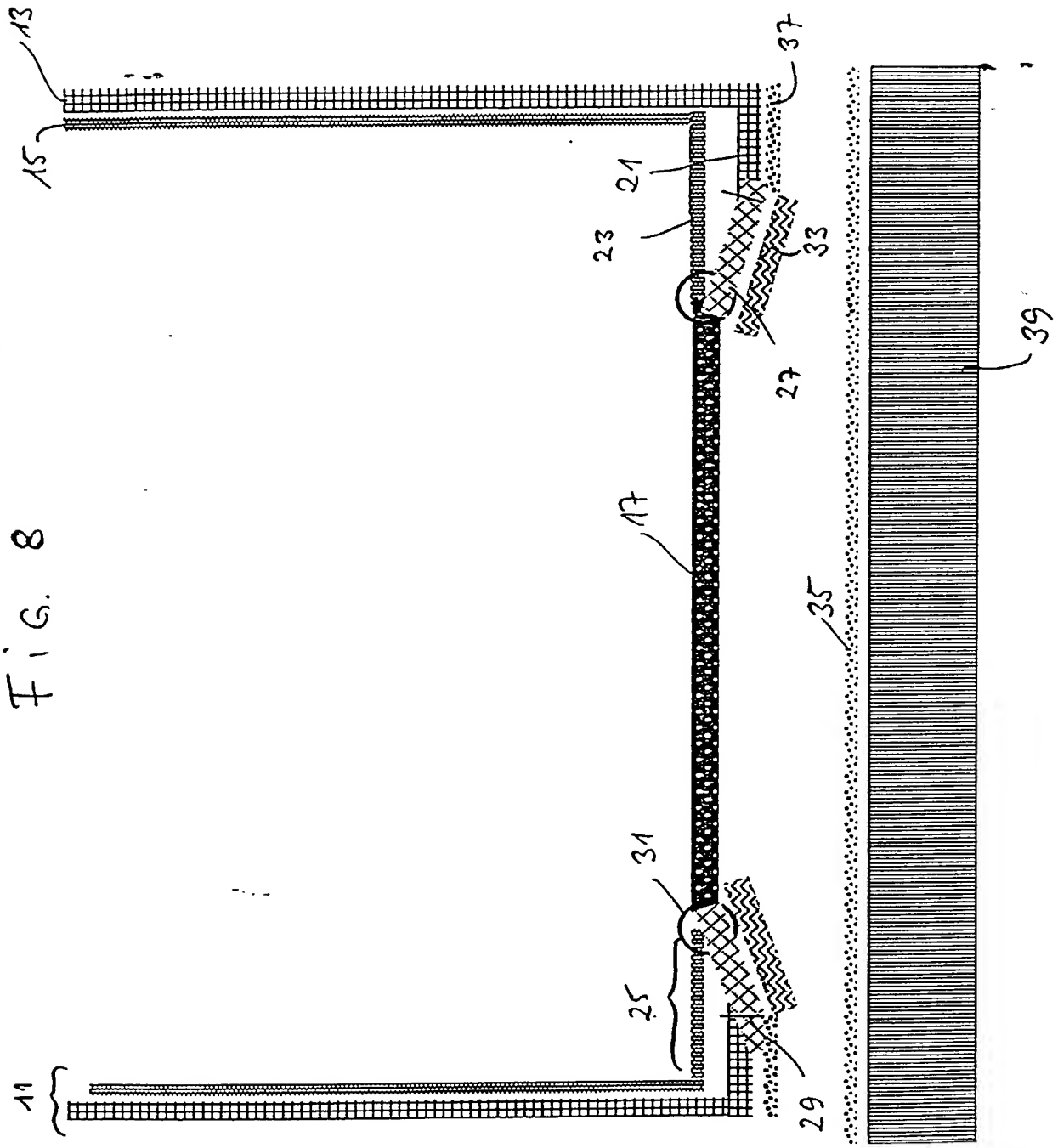


Fig. 8

FIG. 9

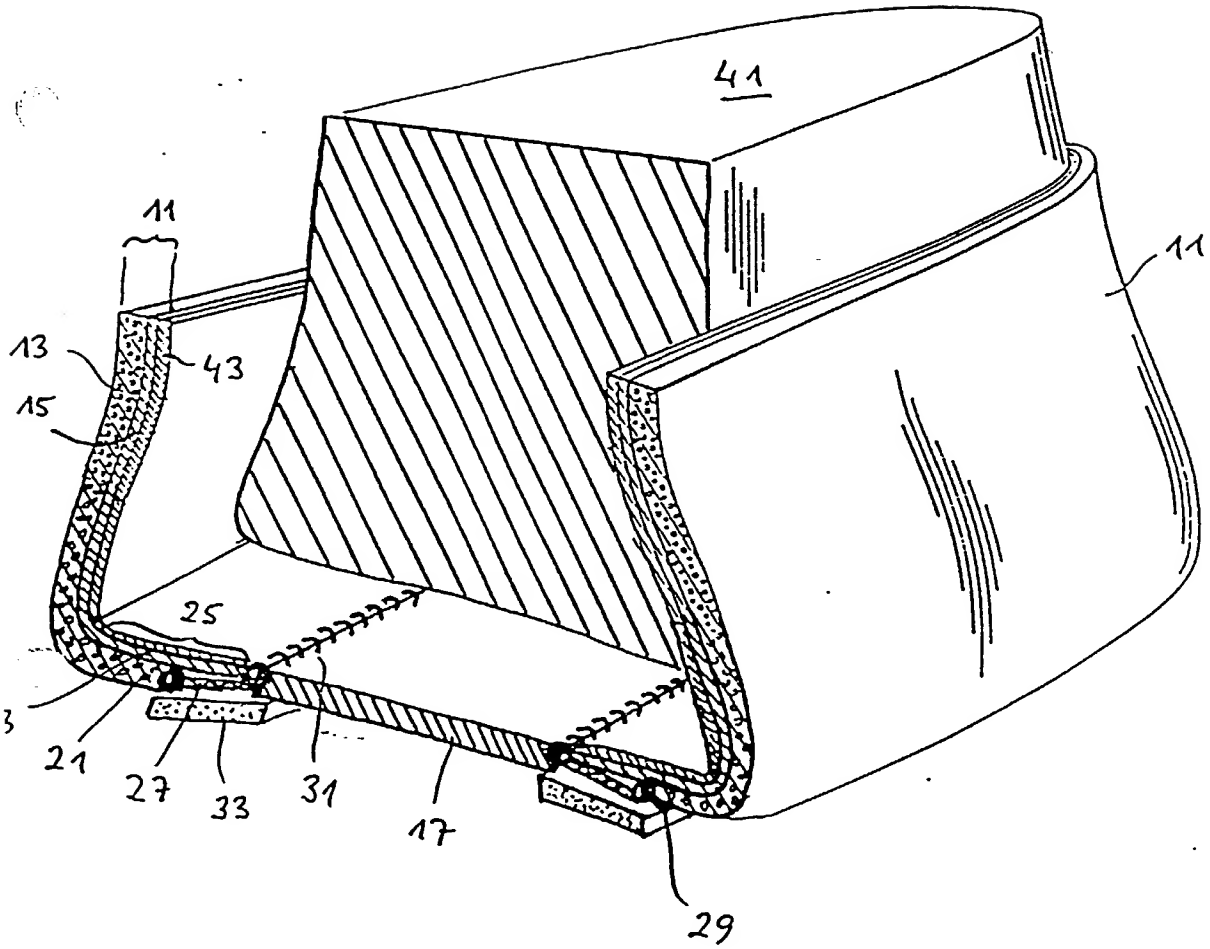


FIG. 11

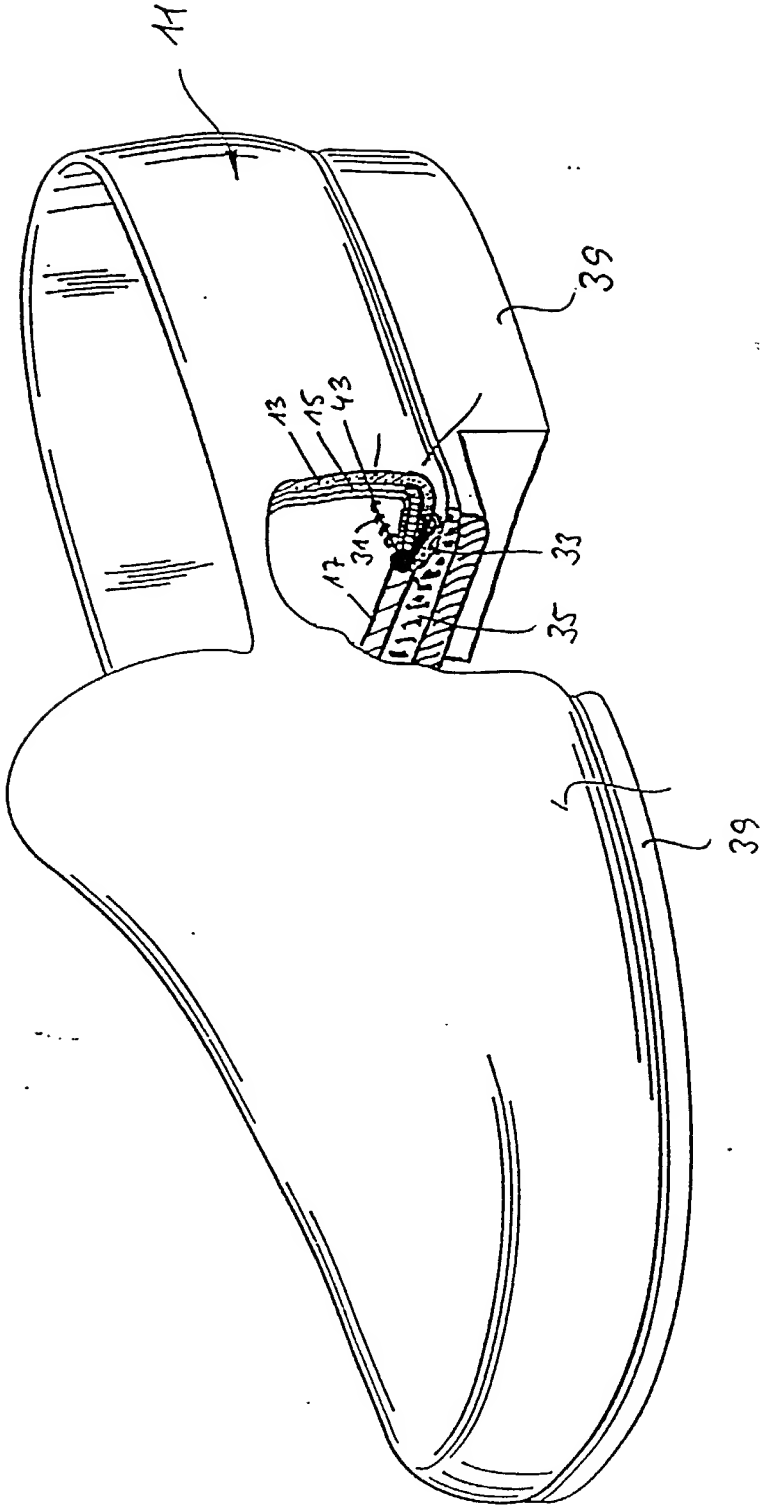
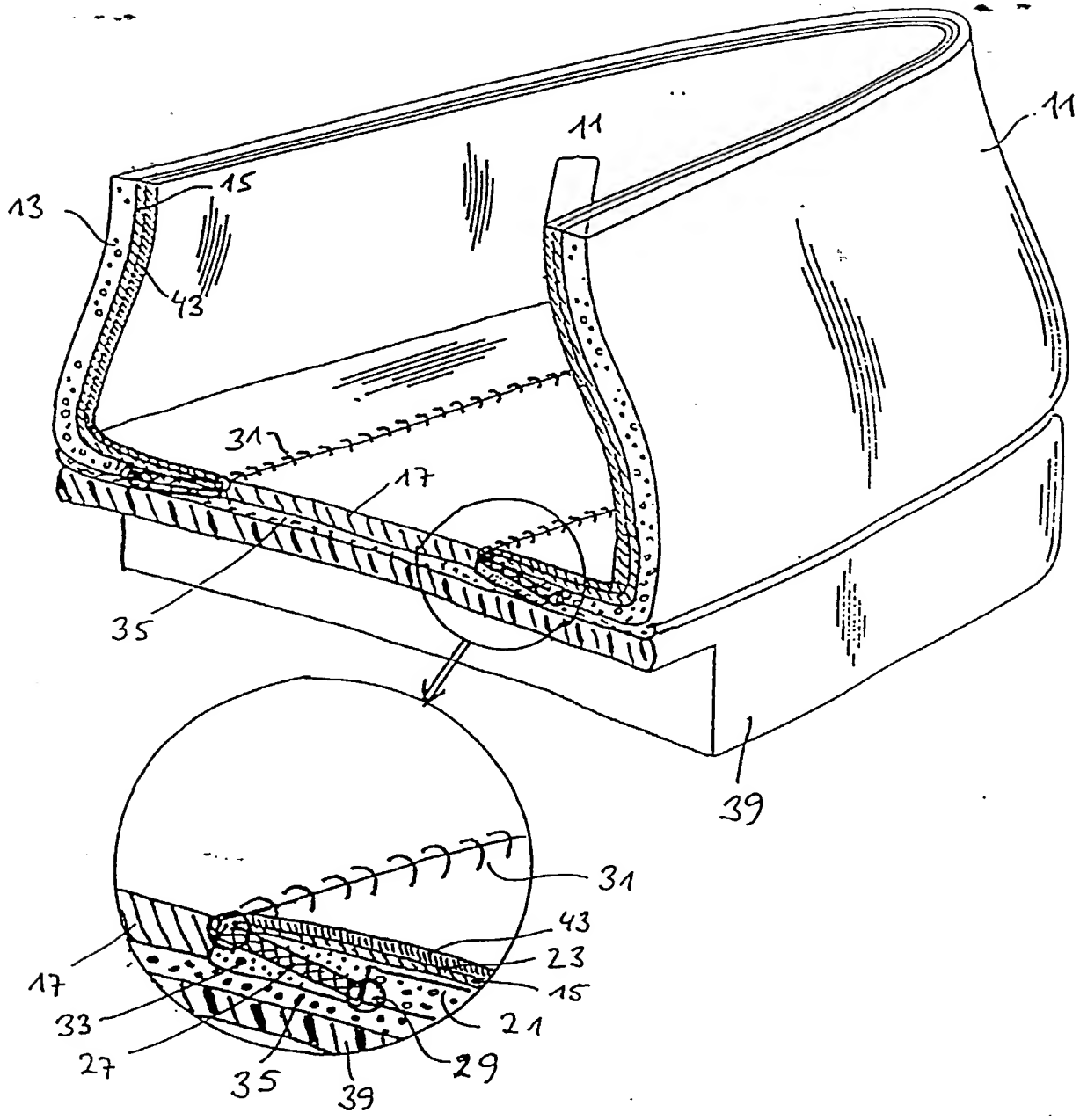


FIG. 10



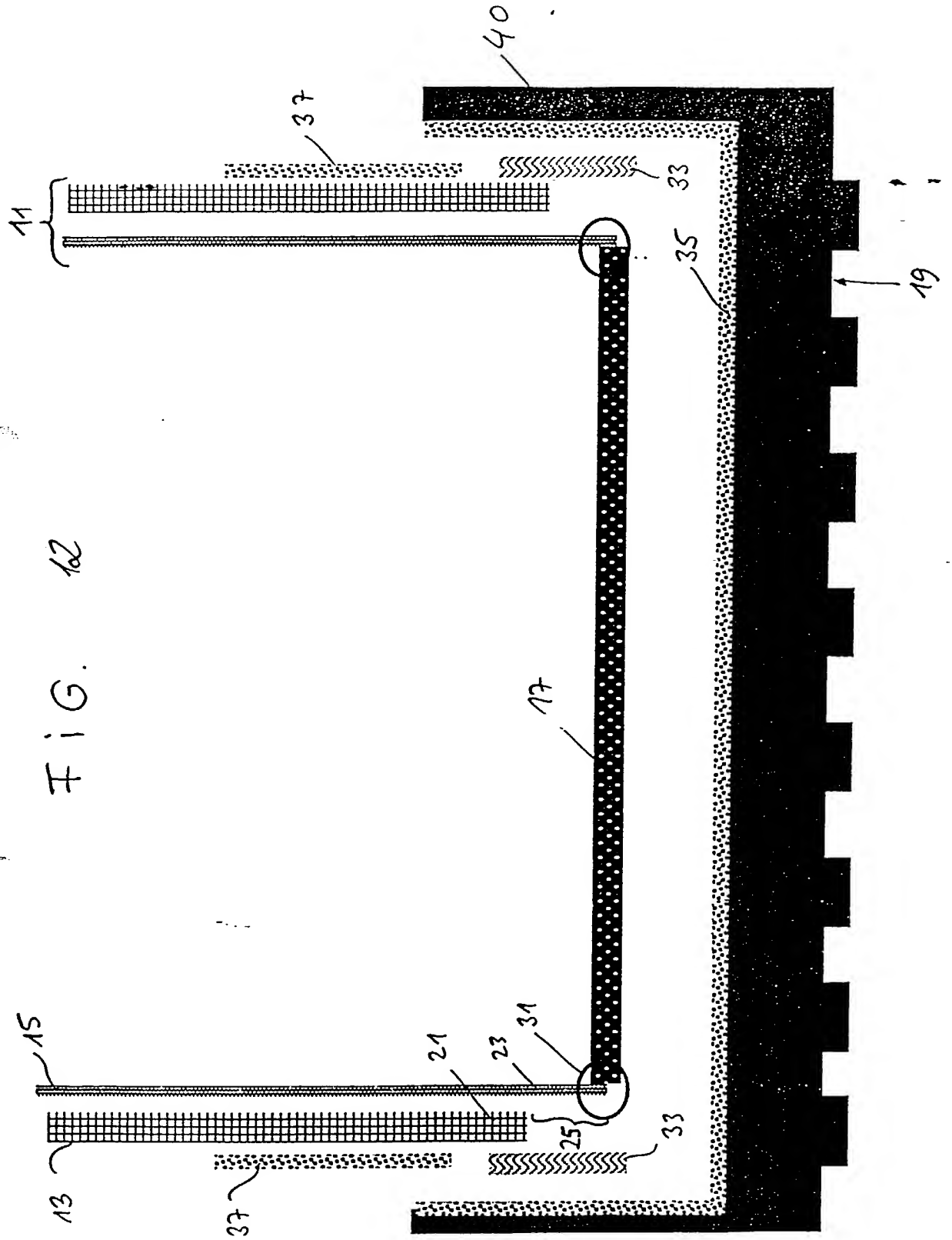


FIG. 12

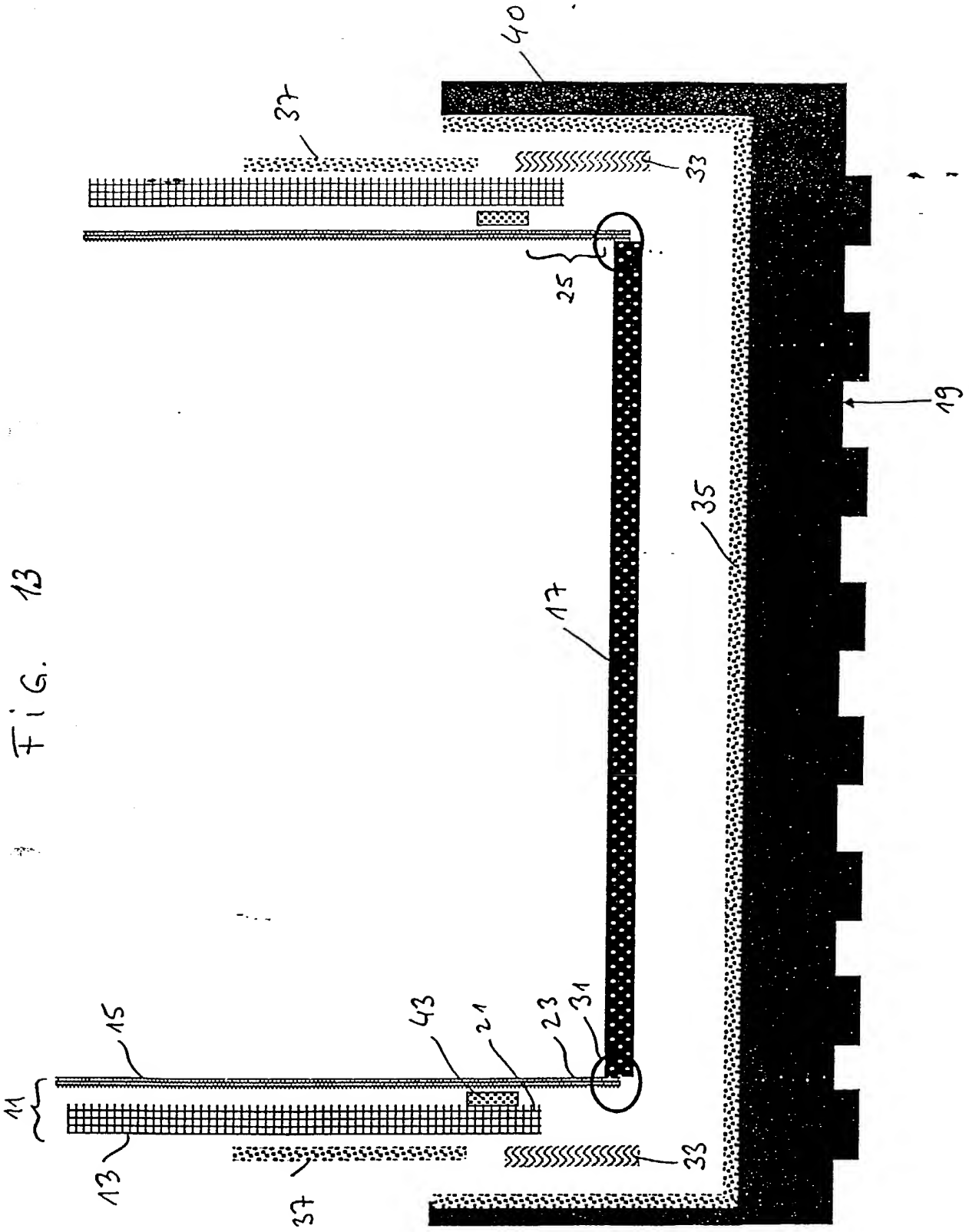


FIG. 13

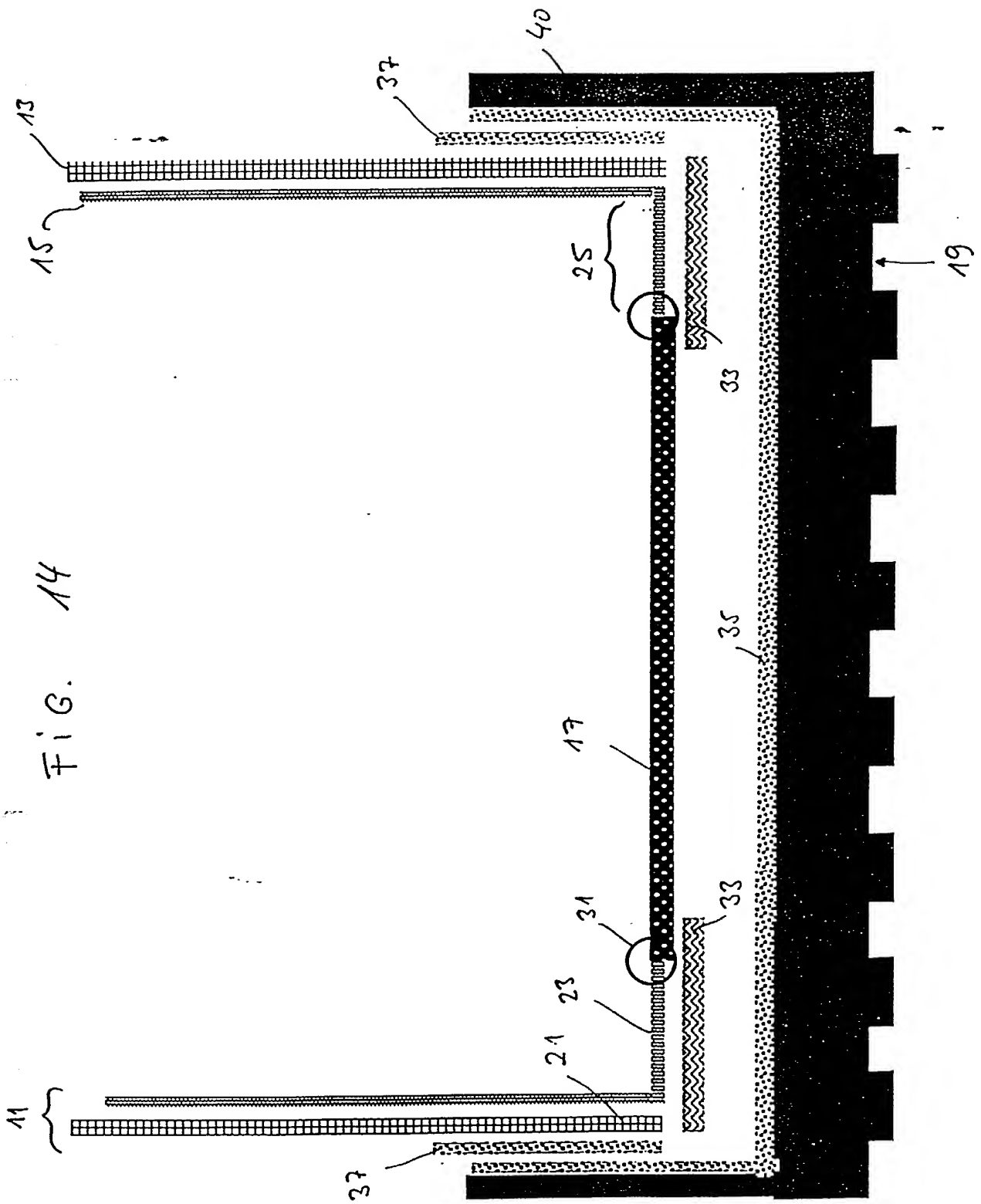


FIG. 14

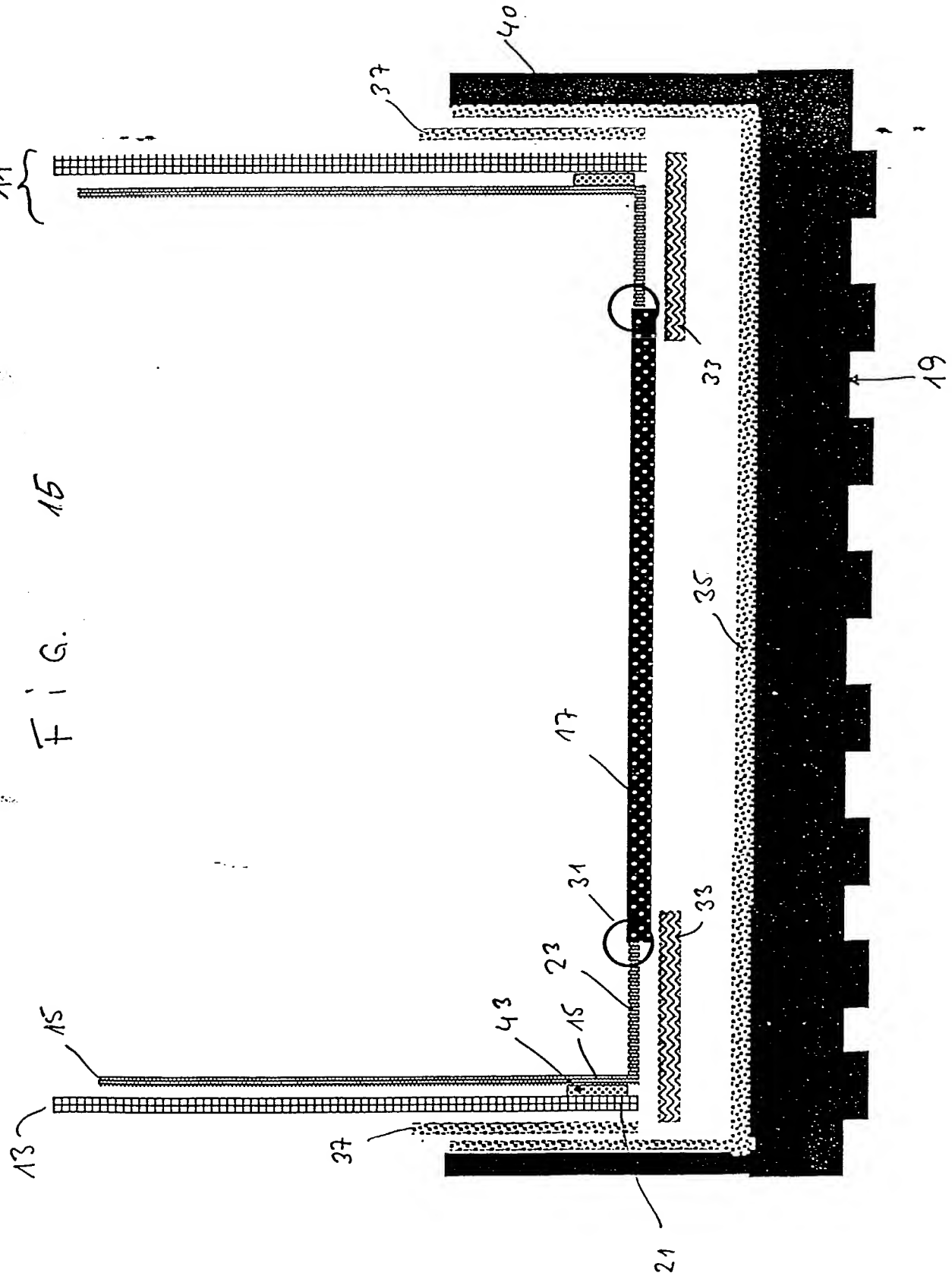


FIG. 15

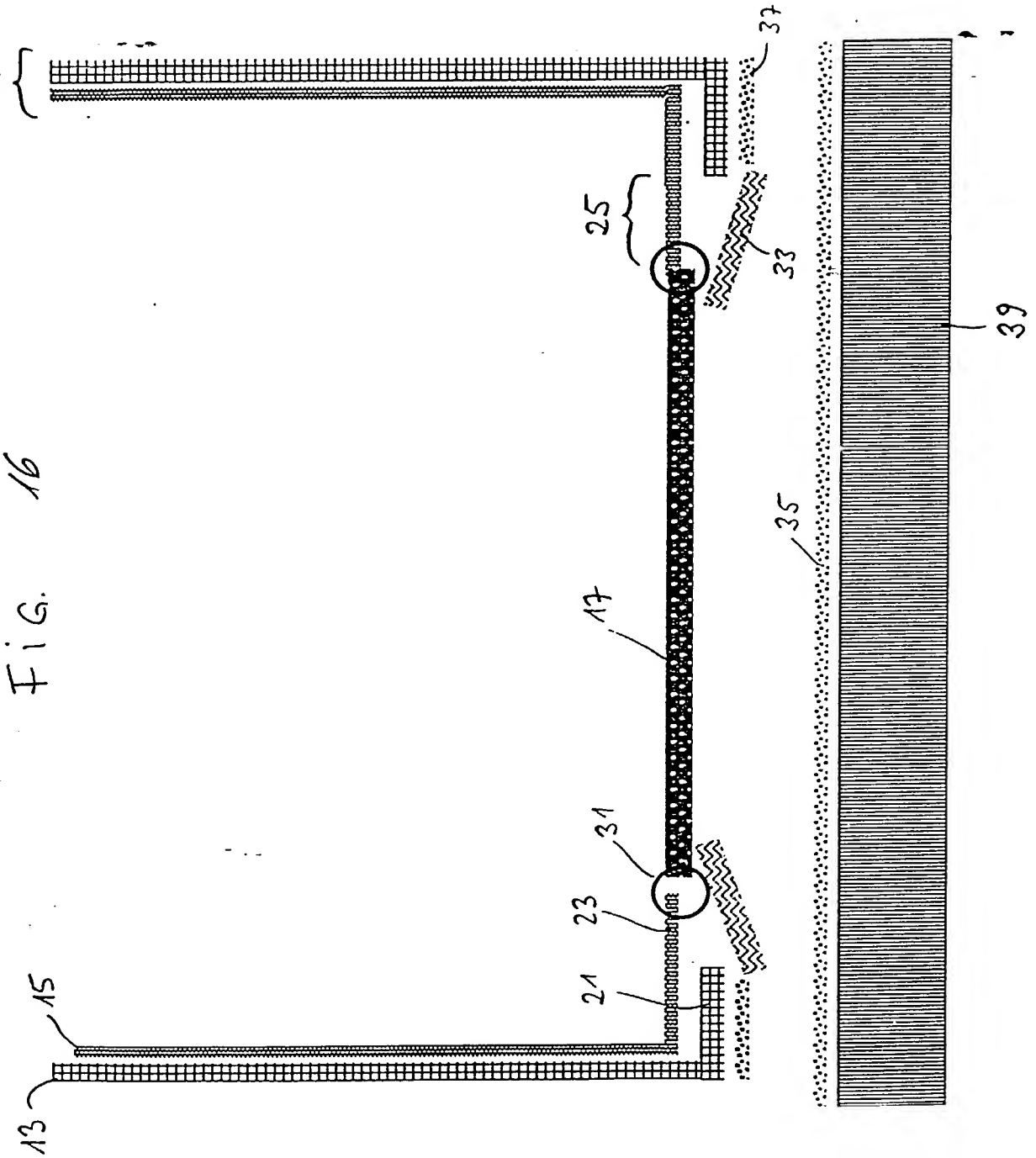


Fig. 16

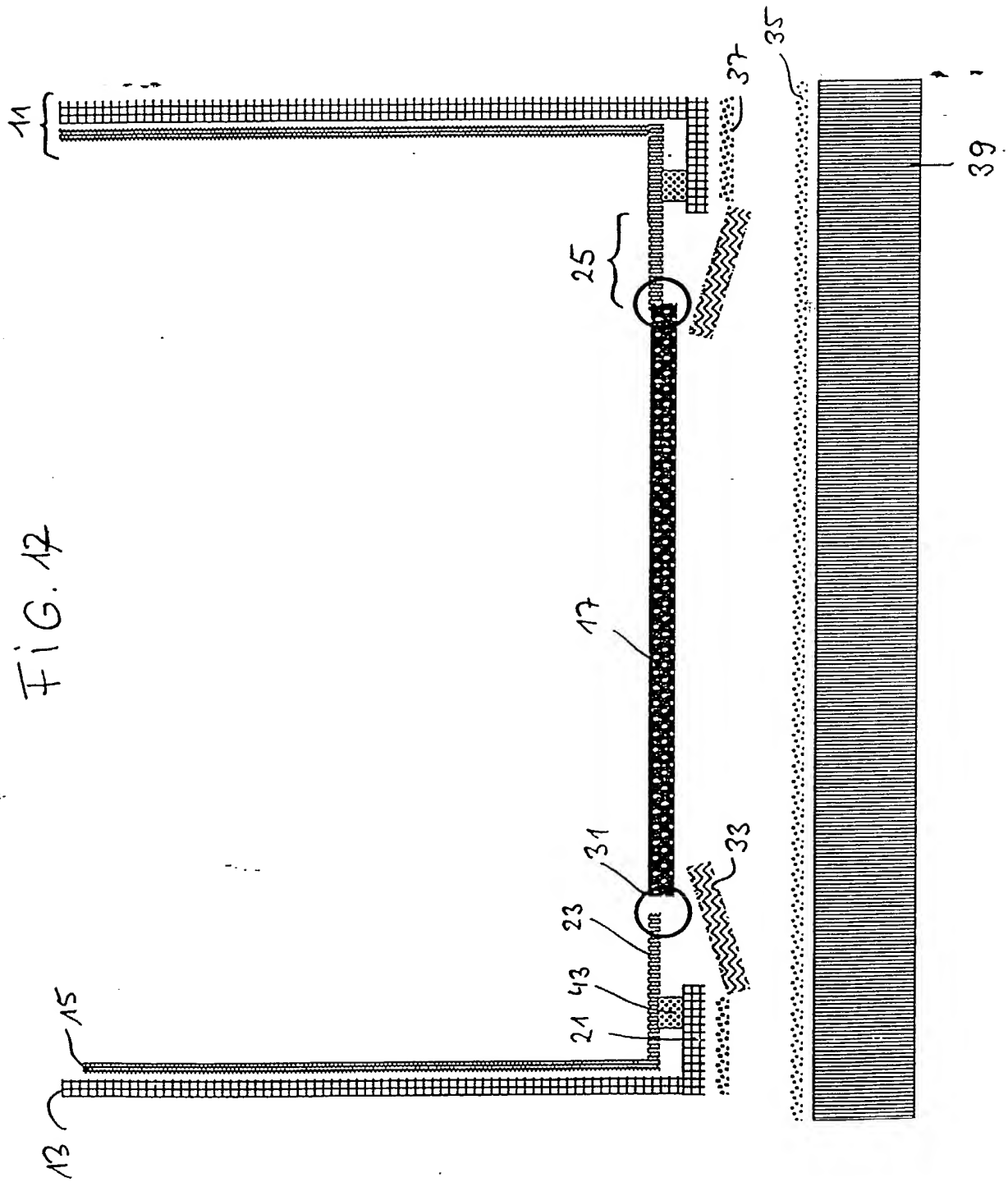


FIG. 12

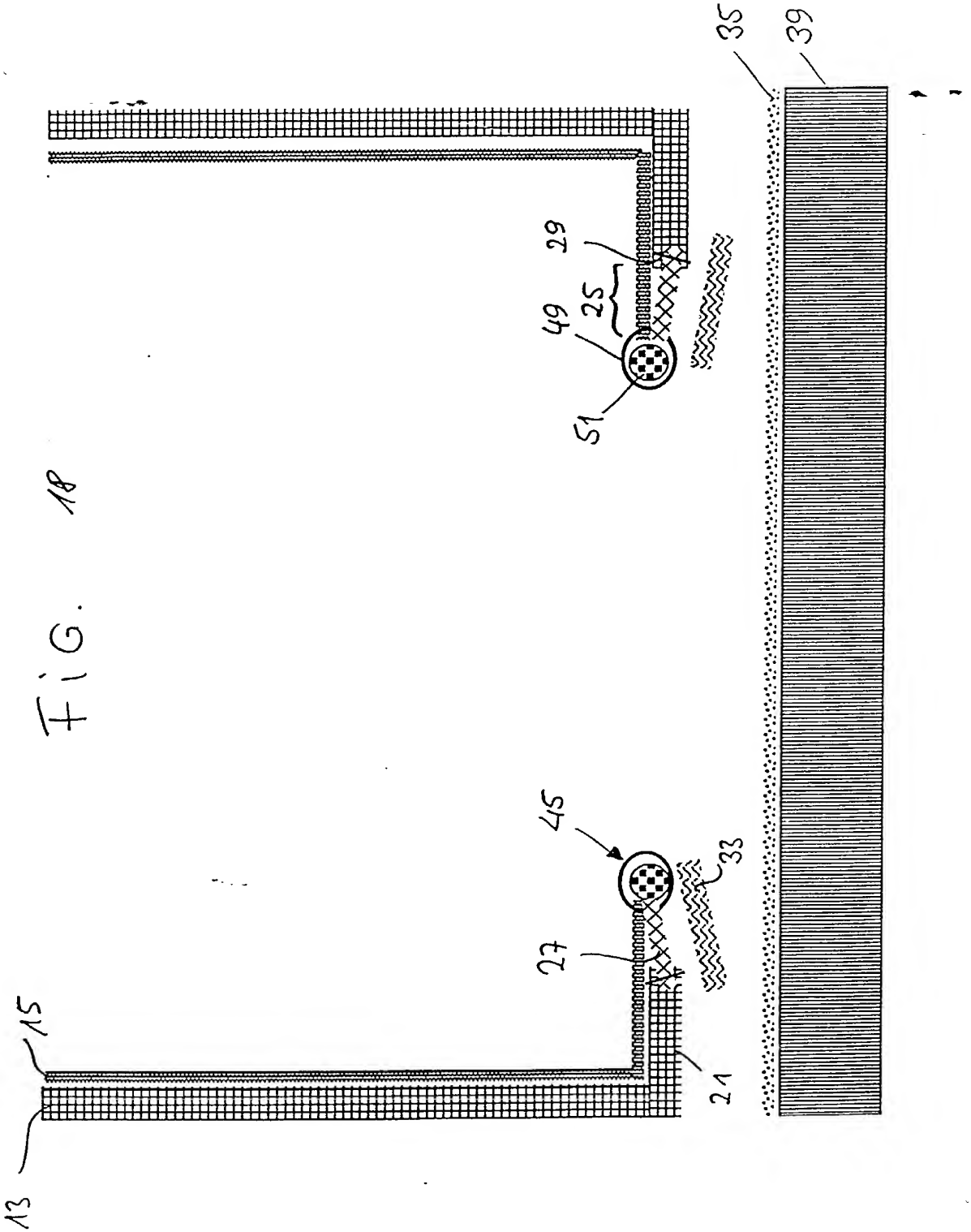


FIG. 18

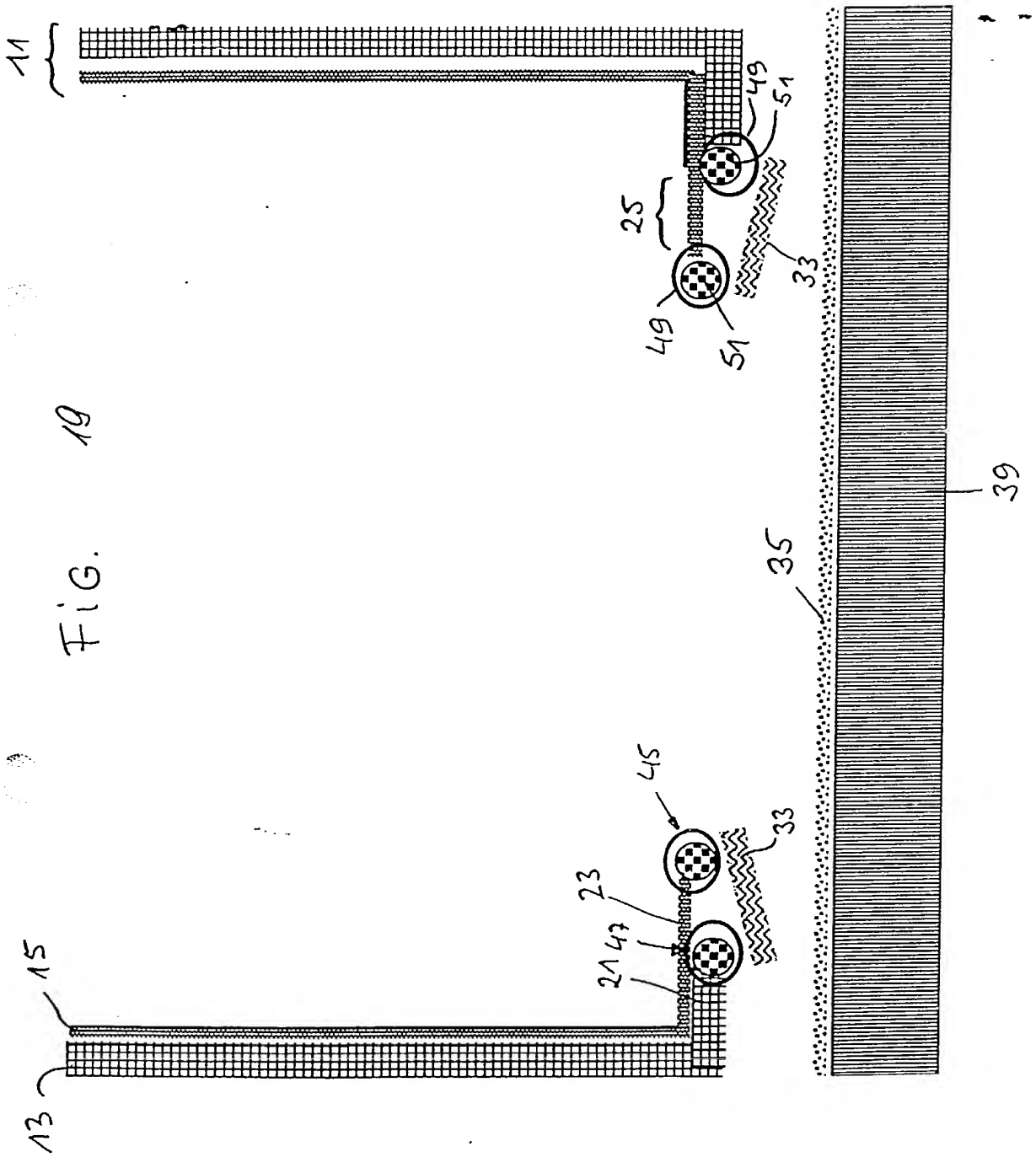


FIG. 1

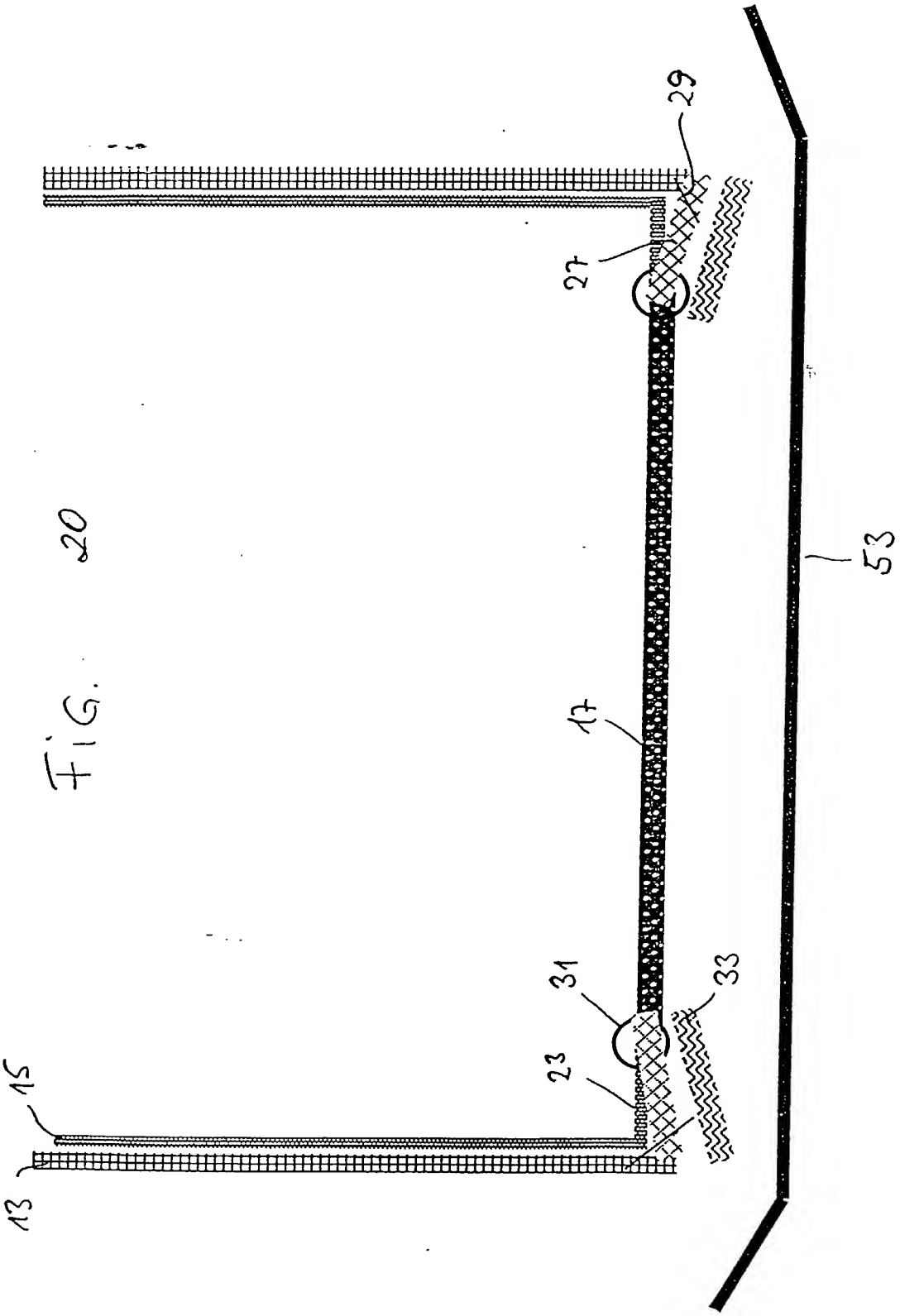


FIG. 20

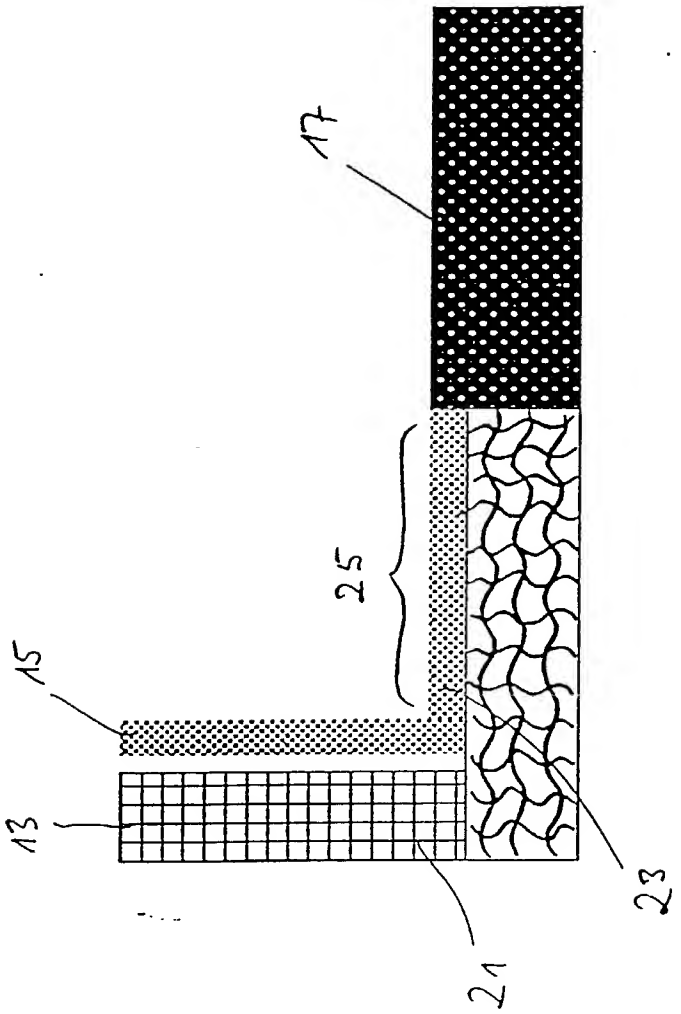


FIG. 21

Attorney Docket No. FA/220A

Declaration and Power of Attorney For Patent Application
Erklärung Für Patentanmeldungen Mit Vollmacht
German Language Declaration

Als nachstehend benannter Erfinder erkläre ich hiermit an Eides Statt:

dass mein Wohnsitz, meine Postanschrift, und meine Staatsangehörigkeit den im Nachstehenden nach meinem Namen aufgeführten Angaben entsprechen,

dass ich, nach bestem Wissen der ursprüngliche, erste und alleinige Erfinder (falls nachstehend nur ein Name angegeben ist) oder ein ursprünglicher, erster und Miterfinder (falls nachstehend mehrere Namen aufgeführt sind) des Gegenstandes bin, für den dieser Antrag gestellt wird und für den ein Patent beantragt wird für die Erfindung mit dem Titel:

_____

_____

_____

deren Beschreibung

(zutreffendes ankreuzen)

☐ hier beigefügt ist.

☐ am _____ unter der

Anmeldungsseriennummer _____

eingereicht wurde und am _____ abgeändert wurde (falls tatsächlich abgeändert).

Ich bestätige hiermit, dass ich den Inhalt der obigen Patentanmeldung einschliesslich der Ansprüche durchgesehen und verstanden habe, die eventuell durch einen Zusatzantrag wie oben erwähnt abgeändert wurde.

Ich erkenne meine Pflicht zur Offenbarung irgendwelcher Informationen, die für die Prüfung der vorliegenden Anmeldung in Einklang mit Absatz 37, Bundesgesetzbuch, Paragraph 1.56(a) von Wichtigkeit sind, an.

Ich beanspruche hiermit ausländische Prioritătsvorteile gemäss Abschnitt 35 der Zivilprozessordnung der Vereinigten Staaten, Paragraph 119 aller unten angegebenen Auslandsanmeldungen für ein Patent oder eine Erfindersurkunde, und habe auch alle Auslandsanmeldungen für ein Patent oder eine Erfindersurkunde nachstehend gekennzeichnet, die ein Anmeldedatum haben, das vor dem Anmeldedatum der Anmeldung liegt, für die Priorität beansprucht wird.

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name,

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled

Footwear Having a Sealed Sole Construction and a Method for the Production Thereof

the specification of which

(check one)

☐ is attached hereto.

☒ was filed on April 27, 2001 as

Application Serial No 09/830,814

and was amended on _____ (if applicable)

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations, §1.56(a).

I hereby claim foreign priority benefits under Title 35, United States Code, §119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

German Language Declaration

Prior foreign applications
Priorität beansprucht

(Number) (Nummer)	(Country) (Land)	(Day/Month/Year Filed) (Tag/Monat/Jahr eingereicht)	Priority Claimed Yes Ja	No Nein
PCT/EP99/08193	WO	28 October 1999	X	
19938784.2	DE	16 August 1999	X	
29819186.5	DE	28 October 1998	X	

Ich beanspruche hiermit gemäss Absatz 35 der Zivilprozessordnung der Vereinigten Staaten, Paragraph 120, den Vorzug aller unten aufgeführten Anmeldungen und falls der Gegenstand aus jedem Anspruch dieser Anmeldung nicht in einer früheren amerikanischen Patentanmeldung laut dem ersten Paragraphen des Absatzes 35 der Zivilprozessordnung der Vereinigten Staaten, Paragraph 112 offenbart ist, erkenne ich gemäss Absatz 37, Bundesgesetzbuch, Paragraph 1.56(a) meine Pflicht zur Offenbarung von Informationen an, die zwischen dem Anmeldedatum der früheren Anmeldung und dem nationalen oder PCT internationalen Anmeldedatum dieser Anmeldung bekannt geworden sind.

I hereby claim the benefit under Title 35, United States Code, §120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, §112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, §1.56(a) which occurred between the filing date of the prior application and the national or PCT international filing date of this application:

(Application Serial No.) (Anmeldeseriennummer)	(Filing Date) (Anmeldedatum)	(Status) (patentiert, anhängig, aufgegeben)	(Status) (patented, pending, abandoned)

Ich erkläre hiermit, dass alle von mir in der vorliegenden Erklärung gemachten Angaben nach meinem besten Wissen und Gewissen der vollen Wahrheit entsprechen, und dass ich diese eidesstattliche Erklärung in Kenntnis dessen abgebe, dass wissentlich und vorsätzlich falsche Angaben gemäss Paragraph 1001, Absatz 18 der Zivilprozessordnung der Vereinigten Staaten von Amerika mit Geldstrafe belegt und/oder Gefängnis bestraft werden koennen, und dass derartig wissentlich und vorsätzlich falsche Angaben die Gültigkeit der vorliegenden Patentanmeldung oder eines darauf erteilten Patentes gefährden können.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

German Language Declaration

VERTRETUNGSVOLLMACHT: Als benannter Erfinder beauftrage ich hiermit den nachstehend benannten Patentanwalt (oder die nachstehend benannten Patentanwälte) und/oder Patent-Agenten mit der Verfolgung der vorliegenden Patentanmeldung sowie mit der Abwicklung aller damit verbundenen Geschäfte vor dem Patent-und Warenzeichenamt: *(Name und Registrationsnummer anführen)*

POWER OF ATTORNEY: As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith. *(list name and registration number)*

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Eric J. Sheets, 30,326
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Unterschrift des Erfinders Datum	Inventor's signature Date 14.08.01
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Postanschrift	Post Office Address Same as Above
Voller Name des zweiten Miterfinders (falls zutreffend)	Full name of second joint inventor, if any: Alfons Meindl
Unterschrift des Erfinders Datum	Second inventor's signature Date 22.08.01
Wohnsitz	Residence Rosenstr. 6, D-83417 Kirchanschoering DEX
Staatsangehörigkeit	Citizenship German
Postanschrift	Post Office Address Same as Above

(Bitte entsprechende Informationen und Unterschriften im Falle von dritten und weiteren Miterfindern angeben).

(Supply similar information and signature for third and subsequent joint inventors.)